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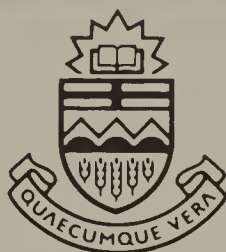
Problem Solving Activities

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Mathematics 5

Problem Solving Activities

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UNIT 1 Organizing Facts

Making organized lists or charts may be useful in solving problems.

Problem:

How many three-digit numerals can be made, each containing the digits 4, 6, and 8?

Solution:

Organized lists show there are 6 three-digit numerals.

<i>Four Hundreds</i>	<i>Six Hundreds</i>	<i>Eight Hundreds</i>
468	648	846
486	684	864

Complete a list or chart to solve the problem.

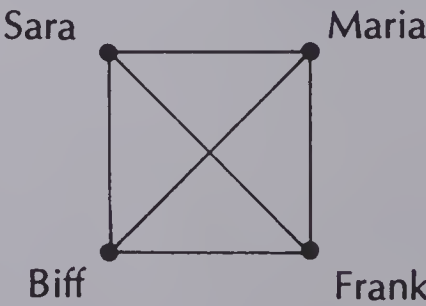
1. List the two-digit numerals that can be made from the digits 1, 2, and 3.

One Ten	Two Tens	Three Tens
12		

2. List *in order* from least to greatest the 24 four-digit numerals that can be made, each containing the digits 3, 5, 7, and 9.
3. Biff, Frank, Sara, and Maria just met and shook hands. Complete the list for all 6 handshakes.

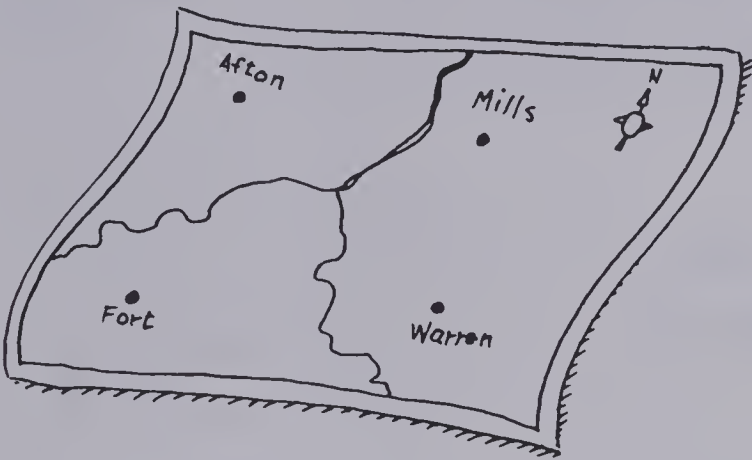
1. Biff-Frank

2.




4. Four towns are connected by roads. Each pair of towns is connected by a different road. Copy the following chart to find the number of roads.

	Afton	Fort	Mills	Warren
Afton	no road	same road		
Fort	1 road	no road		
Mills			no road	
Warren				



5. Six people shake hands at a party. Copy the following chart to list the handshakes. Do not count a handshake between the same two people twice.

Alice	Bob	Cindy	Dave	Elsie	Faro
					

6. List the *odd* four-digit numerals, each containing the digits 3, 4, 5, and 6.
7. List the *even* three-digit numerals that can be made from 0, 1, 2, 3, and 4.

Name tags can be used to help with ordering.

Problem:

Dixie, Allan, Ben, and Carla played a dart tournament. One of the girls scored the most points. Ben scored more points than Dixie but fewer than Allan. What was the order of finish for the tournament?

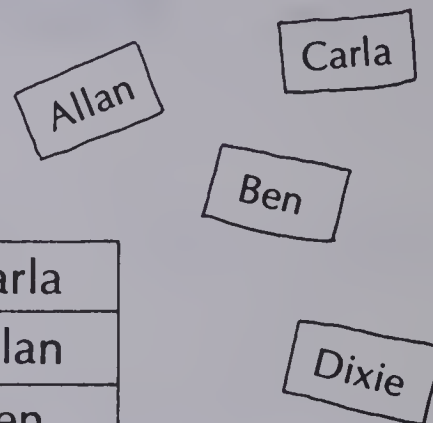
Solution:

Name tags can be used to order the facts.

A girl won. Ben scored more points than Dixie.
Thus Carla won.

Ben scored fewer than Allan.
Thus Allan was second.

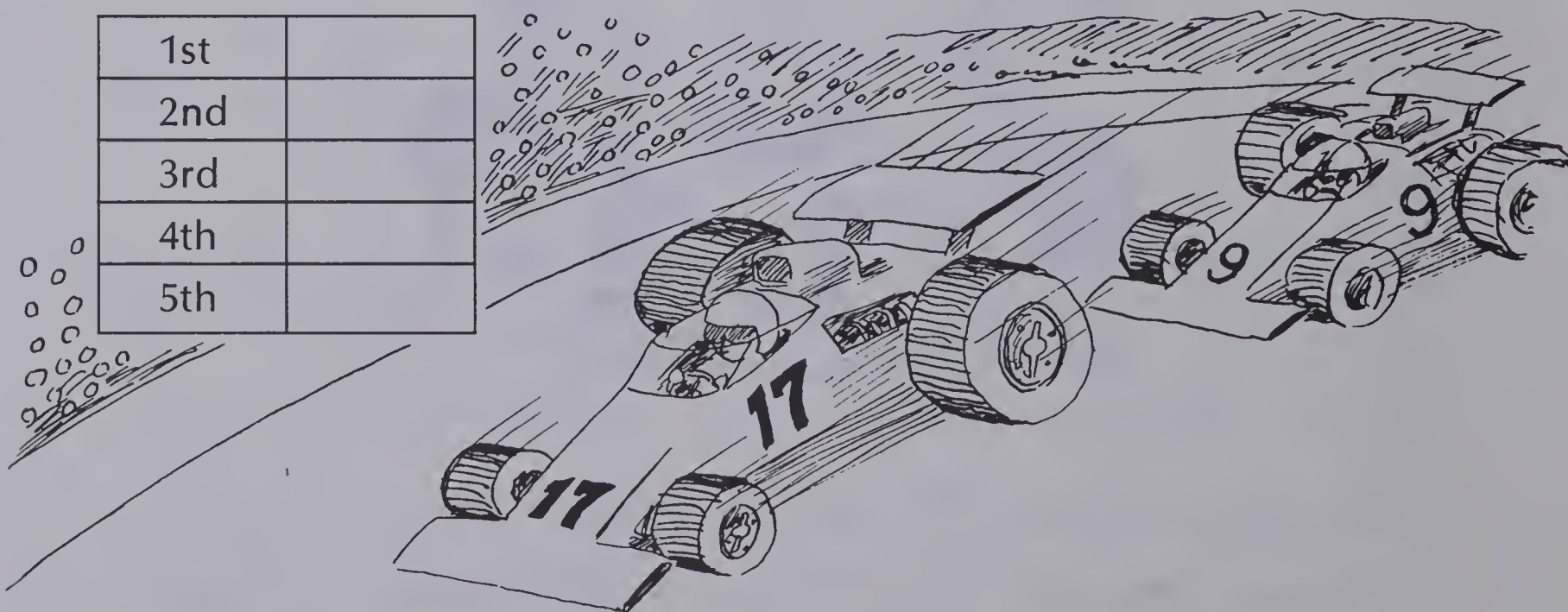
1st	Carla
2nd	Allan
3rd	Ben
4th	Dixie



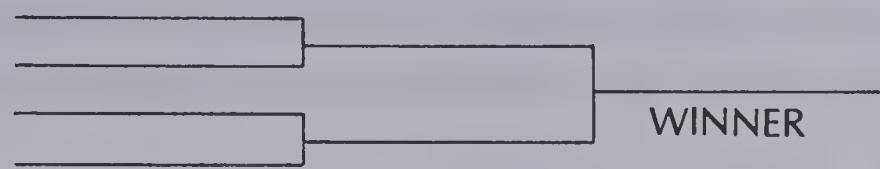
Organize the facts, then solve the problem.

1. Cars numbered 4, 9, 14, 15, and 21 finished a 500-lap race. Car 21 finished ahead of Car 4 but did not win the race. Car 14 finished ahead of Car 9. Car 4 finished ahead of Car 15. Car 21 finished just behind Car 9. Find the order of finish of the cars.

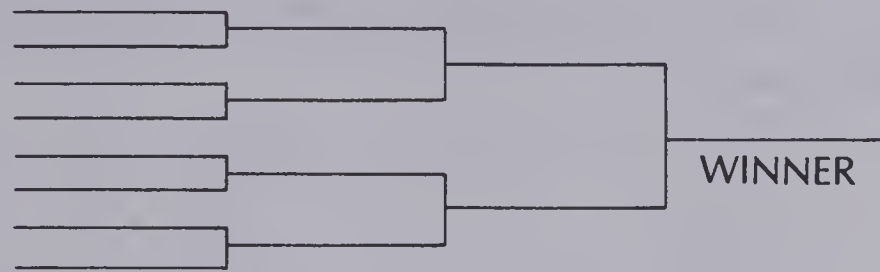
1st	
2nd	
3rd	
4th	
5th	



2. In a school volleyball league, the Blue team defeated the Red team. The Green team defeated the Gold team but lost to the Blue team. Which team won first place?



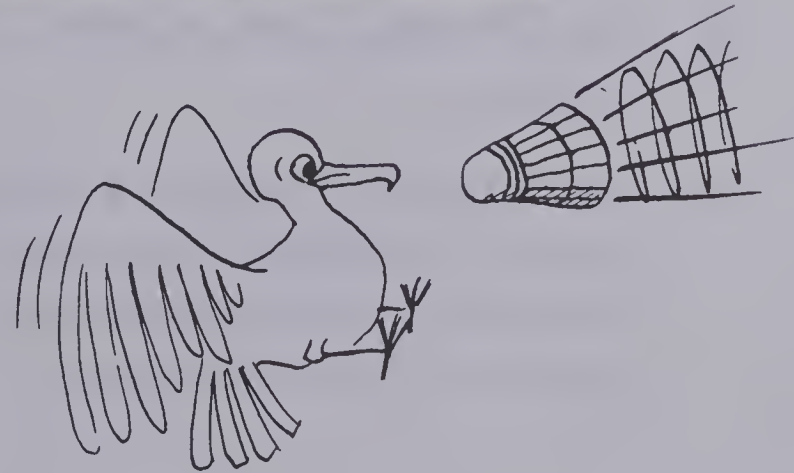
3. There were eight girls in a tennis tournament where one loss eliminated the player. Karen defeated Betty. Kathy defeated Barb and Karen but lost to Kim. Kelly defeated Beth but lost to Kim. Kim defeated Bonnie. Who won the tournament?



4. The Beavers, Bears, Bobcats, and Buffalos played each other once during a round-robin tournament. The Bobcats lost all three games. The Beavers defeated the Buffalos and lost to the Bears. The Bears defeated the Buffalos. How many games had each team won?

	Beavers	Bears	Bobcats	Buffalos
Beavers				
Bears				
Bobcats				
Buffalos				

5. Four schools competed in the finals of a badminton tournament where one loss eliminated the school from the competition. Lakeside defeated Wales. Hillcrest defeated Barnes but lost to Lakeside. Which school won the tournament?



UNIT 2 Guessing and Testing

A guess-and-test method may be used to solve many problems. Each incorrect guess can provide clues that lead to an improved guess or a solution.

Problem:

When Yasmin opened her math book she noticed that the sum of the open pages was 313. What two pages were showing?

Solution:

The two numbers are *consecutive*, such as 2 and 3, or 34 and 35. Pages in a book are numbered that way.

$$\begin{array}{r} 1st\ Try \\ 100 \\ +101 \\ \hline 201 \end{array}$$

too small

$$\begin{array}{r} 2nd\ Try \\ 150 \\ +151 \\ \hline 301 \end{array}$$

closer

$$\begin{array}{r} 3rd\ Try \\ 160 \\ +161 \\ \hline 321 \end{array}$$

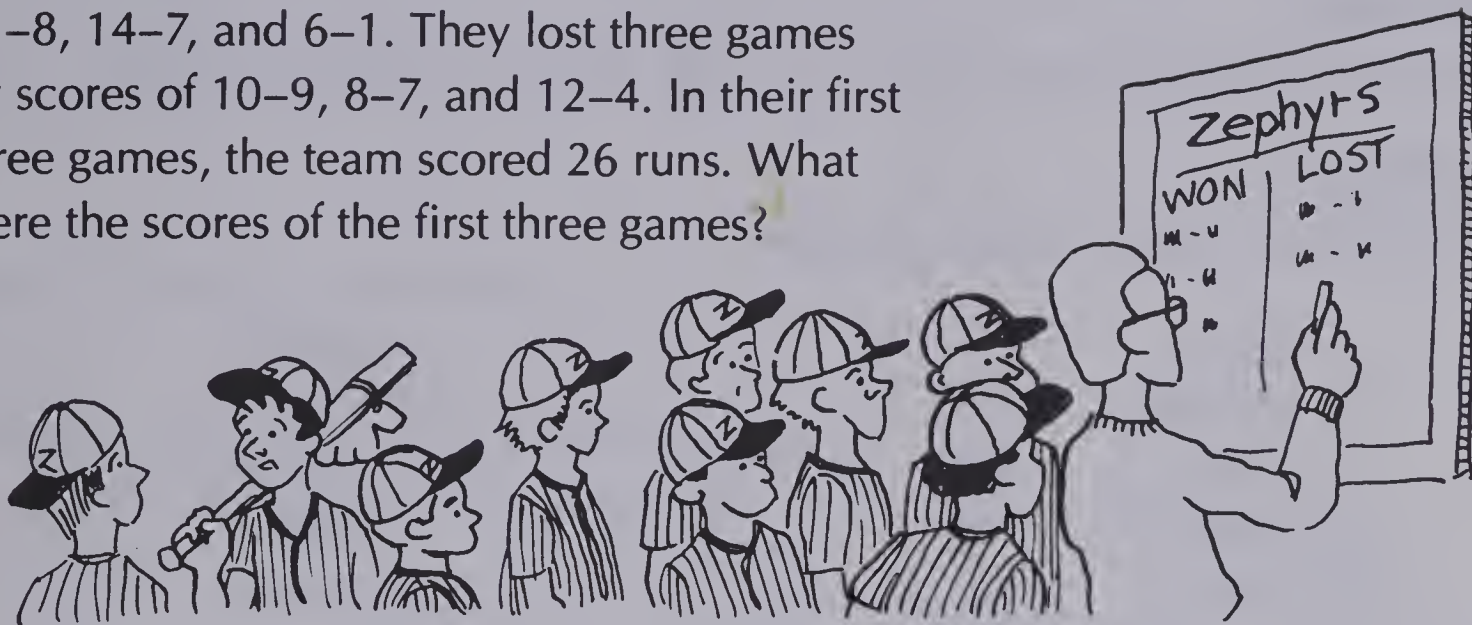
too large

$\begin{array}{r} 4th\ Try \\ 156 \\ +157 \\ \hline 313 \end{array}$
--

Guess and test to solve the problem.

1. What two consecutive pages have a sum of 257?
2. What three consecutive pages have a sum of 579?
3. The difference of two numbers is 4. Their sum is 18. What are the numbers?
4. The difference of two numbers is 39. Their sum is 433. What are the numbers?
5. The Braves won 5 games in a row at the beginning of the football season. The scores in the games were 21–14, 24–10, 7–0, 17–16, 12–7. The team scored 48 points in the first three games. What were the scores of the first three games?

6. A baseball team won three games by scores of 11–8, 14–7, and 6–1. They lost three games by scores of 10–9, 8–7, and 12–4. In their first three games, the team scored 26 runs. What were the scores of the first three games?



7. Add four of the numbers shown to make 18.

1	2	3	4	5	6	7	8
---	---	---	---	---	---	---	---

8. Add four of the numbers to make 80.

12	14	16	18	20	22	24	26	28
----	----	----	----	----	----	----	----	----

9. A whole number has two digits. The second digit is two times more than the first digit. The sum of the digits is 12. What is the number?

10. Mary is half as old as Tom. George is 3 years older than Tom. The sum of Mary, Tom, and George's ages is 58. How old is Tom?

11. Replace the letters with the digits 1, 2, 3, 4, 5, 6, 7, 8, or 9 so that the answer is 100. No digit may be used more than once.

$$\begin{array}{r}
 A B C \\
 + D E F \\
 \hline
 \square \square \square \\
 - G H I \\
 \hline
 100
 \end{array}$$

Problem:

Find a way to make 50¢ worth of change that uses exactly 25 coins.

Solution:

Use coins to help you make guesses.

<u>1st Try</u>	
15 pennies	15¢
5 nickels	25¢
1 dime	10¢
+ 0 quarters	+
21	50¢

not enough coins

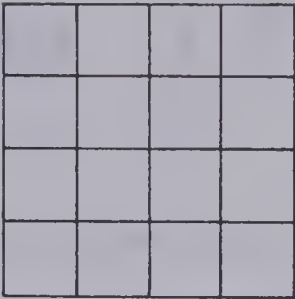
<u>2nd Try</u>	
20 pennies	20¢
4 nickels	20¢
1 dime	10¢
+ 0 quarters	+
25	50¢

Guess and test to solve the problem.

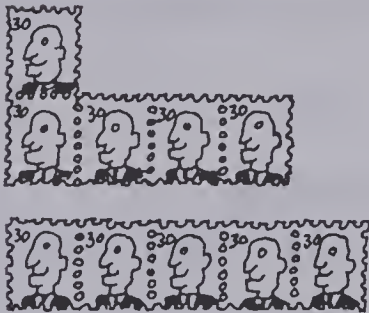
1. Jan had three quarters, three dimes, and three nickels. She selected exactly three coins with a value of 45¢. Which coins did Jan choose?
2. You are to spend exactly 53¢ using seven coins. Which coins should you use?
3. Find a way to make 80¢ worth of change that uses exactly 40 coins.
4. Walter wants to spend exactly \$2.00 on his lunch. What can he order?

M E N U			
Sandwich	\$1.25	Milk Shake	\$0.65
Hot Dog	\$0.85	Cake	\$0.95
Chili	\$0.70	Milk	\$0.20
Soup	\$0.55	Soft Drink	\$0.35

5. Place the digits 1, 2, 3, and 4 on a 4 by 4 grid so that each row, column, and diagonal contains each digit only once.



6. Arrange a set of five stamps edge to edge. How many different ways can they be arranged?



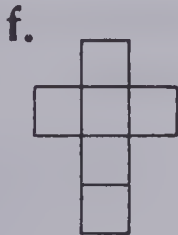
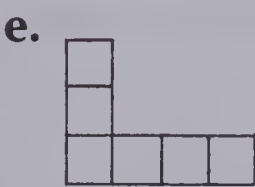
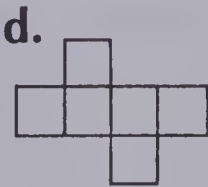
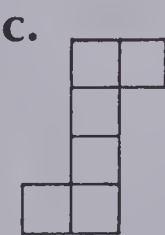
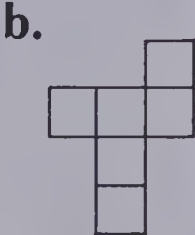
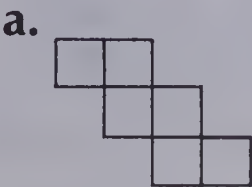
7. Make a path on the grid so that the sum of the numbers in the path is 245. You may not move diagonally.

Start ↓			
48	27	6	29
13	8	21	40
26	35	10	16
14	3	5	30
↓ Finish			

8. Put a + or – or = sign in each empty box on the grid to make a true statement.

24		13		43		54
16		12		28		32
6		22		13		15
2		3		2		7

9. Which of the patterns can make a cube?



UNIT 3 Choosing the Operation

Key words may help you choose an operation to solve a problem.

Problem:

Sharon and Henry played the videogame "Multi-Targets." Henry scored 478 points. Sharon scored 506 points. Write a question for each of these examples.

- a. $506 + 478$ b. $506 - 478$

Solution:

- a. You **add** to find the **total**. The question could be, "How many points did Sharon and Henry score in total?"
- b. You **subtract** to find a **difference**. The question could be, "What was the difference between Sharon's score and Henry's?"

Write a question so that the operation shown will solve the problem.

Janet collected a complete set of 15 cards each for 16 baseball teams. Allan had complete sets of cards for 11 different teams.

1. $16 - 11$ 2. 15×16 3. 15×27

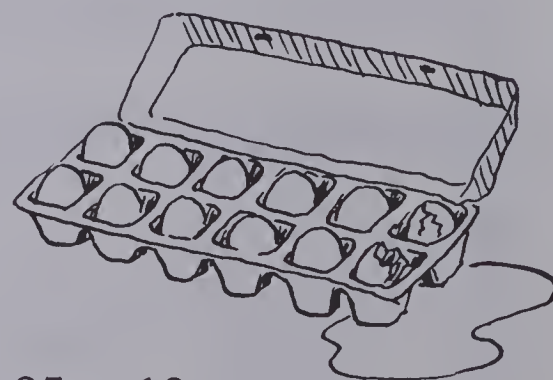
Sarah bowled games of 204 and 168.

Nick bowled games of 231 and 157.

4. $231 + 157$ 5. $231 - 157$ 6. $231 - 204$

Mr. Jones, a grocer, bought 25 cartons of eggs for his store. There were 12 eggs in each carton. During shipping, two eggs in each carton were broken.

7. 25×12 8. $12 - 2$ 9. 25×10



Anna swam 9 laps of a 50 foot pool. Beatrice swam 12 laps.

10. 9×50

11. 12×50

12. $600 - 450$

Jeans which regularly cost \$25.90 are on sale for \$19.95. Sweatshirts which regularly cost \$18.50 are on sale for \$12.99.

13. $\$25.90 - \19.95

14. $\$19.95 + \12.99

15. $\$18.50 - \12.99

Mrs. Brooks bought 4 bars of soap at \$0.65 each, a broom for \$3.69, and a bucket for \$1.95. She paid for these items with a \$10.00 bill.

16. $4 \times \$0.65$

17. $\$3.69 + \$2.60 + \$1.95$

18. $\$10.00 - \8.24

Allan practiced the trumpet from 4:30 to 5:15. Mark practiced the clarinet for 35 minutes starting at 4:15.

19. $5:15 - 4:30$

20. $4:15 + 0:35$

21. $45 - 35$

The driving distance from Aunt Mary's house to Grandma's house is 190 miles. From Grandma's to Uncle Bill's is 369 miles and from Uncle Bill's to our house is 426 miles.

22. $190 + 369 + 426$

23. $426 - 369$

24. $985 + 985$

The upper deck of a stadium has 40 rows with 200 seats in each row. The lower deck has 90 rows with 300 seats in each row.

25. $90 + 40$

26. 200×40

27. $8000 + 27,000$

Mary Jane earns \$2.50 every day after school for babysitting. On Saturdays, she earns \$3.75.



28. $5 \times \$2.50$

29. $\$3.75 - \2.50

30. $\$12.50 - \3.75

Problem:

Socks are selling at \$1.98 a pair or at a special price of two pairs for \$3.00. Is it cheaper to buy two pairs at the special price or two pairs at the individual price?

a.	$\$3.96$	b.	$\$3.96$	c.	$\$3.96 > \3.00
	$\underline{+ 3.00}$		$\underline{- 1.98}$		

Solution:

Two pairs of socks bought at the individual price cost $\$1.98 \times 2 = \3.96 .

Two pairs at the special price cost \$3.00.

Since $\$3.96 > \3.00 , it is cheaper to buy at the special price.

Choose the correct example. Then solve the problem.

- Jerome delivers 74 papers each day Monday through Saturday. How many papers does he deliver each week?
a. 74×7 b. $444 > 74$ c. 74×6
- A nursery sold blue spruce trees at \$14.98 each and green spruce trees at \$9.98 each. Which color spruce tree was less expensive?
a. $\$14.98 + \9.98 b. $\$14.98 - \9.98 c. $\$14.98 > \9.98
- Golf balls were selling at \$1.40 each. How much did one dozen golf balls cost?
a. $\$1.40 + 12$ b. $\$1.40 \times 12$ c. $\$16.80 > \1.40
- Boys basketball shoes, that were regularly \$18.99 a pair, were selling for \$14.97 a pair. How much was the saving by buying the shoes at the lower price?
a. $\$18.99 + \14.97 b. $\$18.99 - \14.97 c. $\$18.99 > \14.97

5. The school library has 134 books about sports. Currently 87 of the books have been taken out by students. How many books about sports are left in the library?
- a. $134 + 87$ b. $134 - 87$ c. $87 + 47$
6. Kate Lowe and her brother, mother, and father were going on a fishing trip. Mr. Lowe bought each member of the family a new rod and reel. He paid \$24.76 for each member of the family. How much did the new equipment cost Mr. Lowe?
- a. $\$24.76 \times 4$ b. $\$99.04 - \24.76 c. $\$99.04 > \24.76
7. A high school drama class sold 403 tickets for the school play. One hundred eighty-five of these tickets were for adults. How many student tickets were sold?
- a. $185 + 403$ b. $403 - 185$ c. $218 > 185$
8. A garden hose cost \$7.97. A nozzle for the hose cost \$2.97. Mr. Johnson bought a hose and nozzle. What was Mr. Johnson's bill?
- a. $\$7.97 + \2.97 b. $\$7.97 - \2.97 c. $\$7.97 > \2.97
9. Five classes are going to a music concert in the school auditorium. There are 34 students from each class. How many students are going to the concert?
- a. $34 + 5$ b. $170 > 34$ c. 34×5
10. Men's and women's 10-speed racing bikes cost \$129.88 each. Boys' and girls' 10-speed racers cost \$128.99 each. Does a girl's bike or a man's bike cost more?
- a. $\$129.88 + \128.99 b. $\$129.88 - \128.99 c. $\$129.88 > \128.99

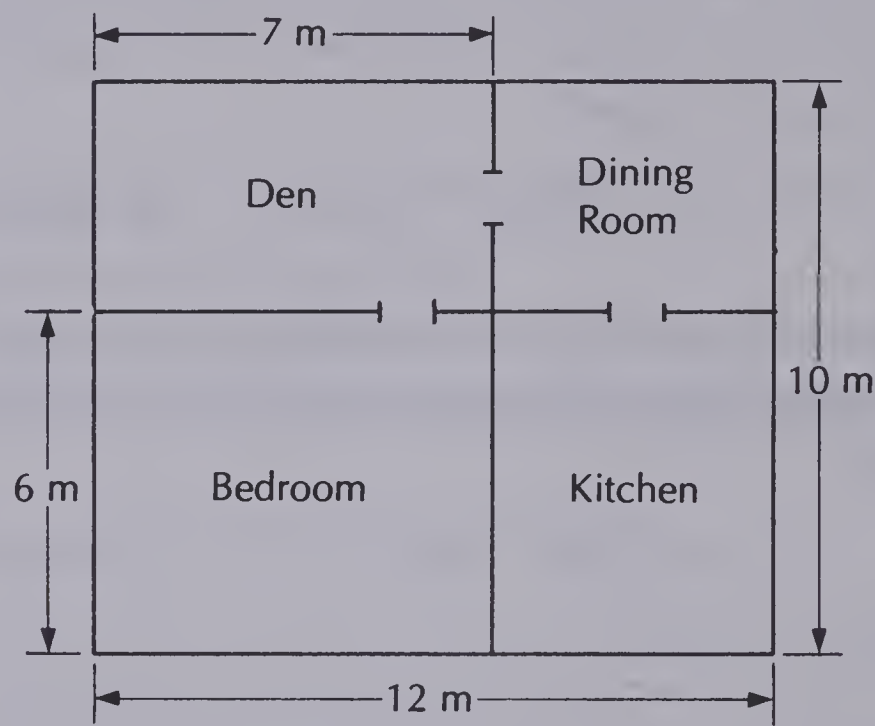


UNIT 4 Using Pictures

The information required to solve a problem may be given in a picture.

Problem:

How much longer than wide is the dining room?

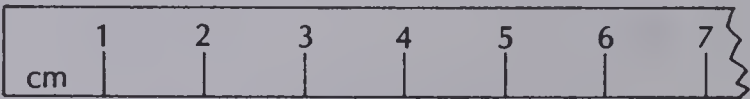


Solution:

The dining room is $(12\text{ m} - 7\text{ m})$ or 5 m long and $(10\text{ m} - 6\text{ m})$ or 4 m wide.

The dining room is $(5\text{ m} - 4\text{ m})$ or 1 m longer than it is wide.

Use the picture to solve the problem.



1. How long is **E**?

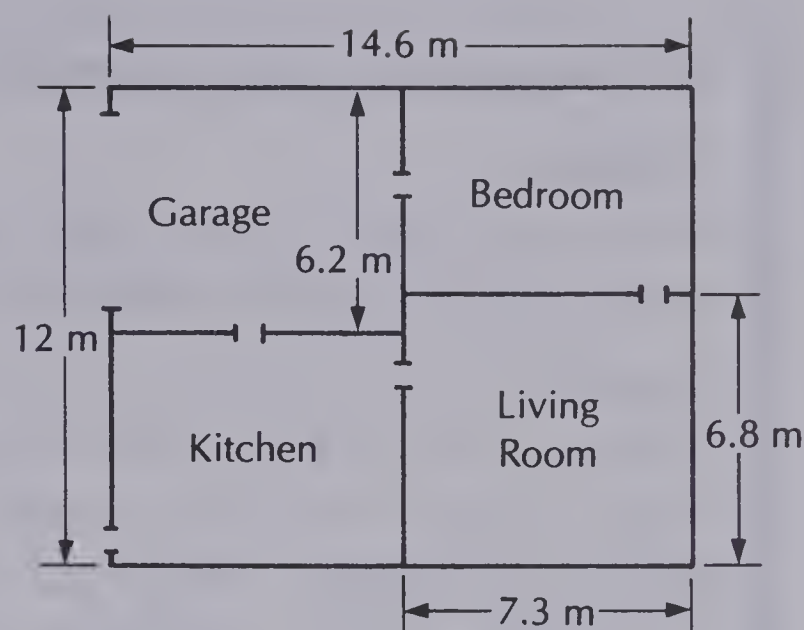
A. _____
2. How much longer is **D** than **A**?

B. _____
3. How long are **B** and **C** together?

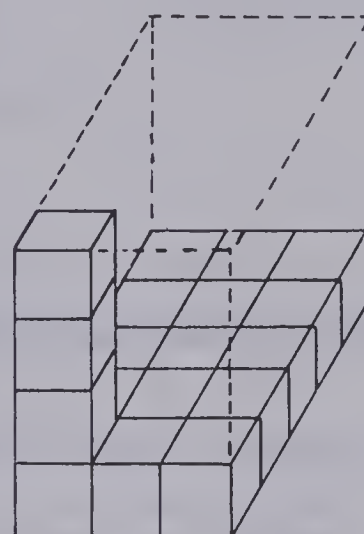
C. _____
4. How much longer is **E** than **C**?

D. _____
- E. _____

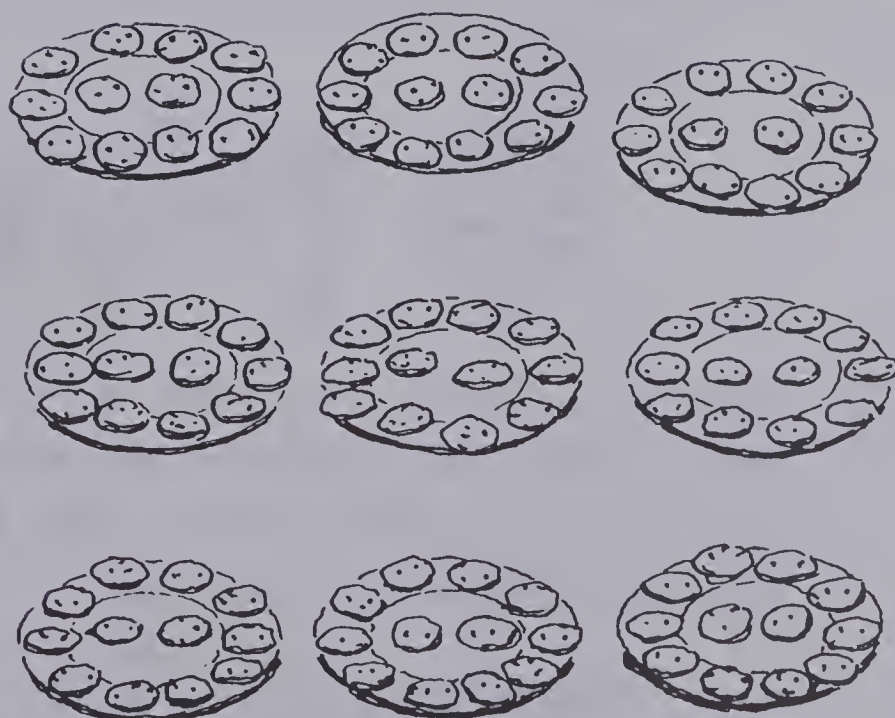
5. How much longer than wide is the living room?
6. How much longer than wide is the garage?
7. How much longer than wide is the kitchen?



8. How many blocks will fit in the box?
9. How many blocks will fit in half of the box?
10. Double the length, width, and height of the box. How many blocks are needed to fill the bigger box?



11. If all of the cookies are shared by eight people, how many cookies would each person get?
12. If half of these cookies are shared by 4 people, how many cookies would each person get?



Drawing a picture can help you solve a problem.

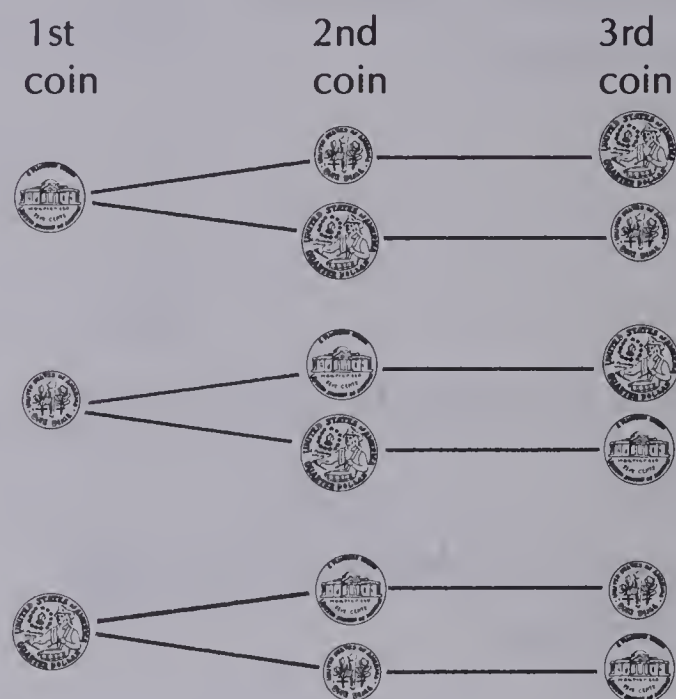
Problem:

Kevin has a nickel, a dime, and a quarter in his pocket. He takes them out one at a time. List all the ways Kevin can take the coins out of his pocket.

Solution:

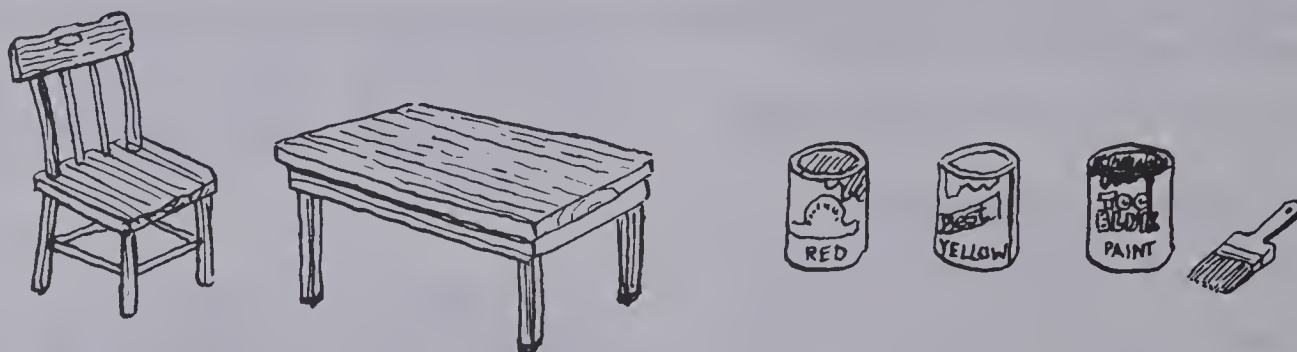
The first coin could be a nickel. If the nickel comes out first, the second coin could be either a dime or a quarter. If the second coin is a dime, the third coin must be the quarter.

There are 6 different ways.



Solve the problem. Draw a picture to help you.

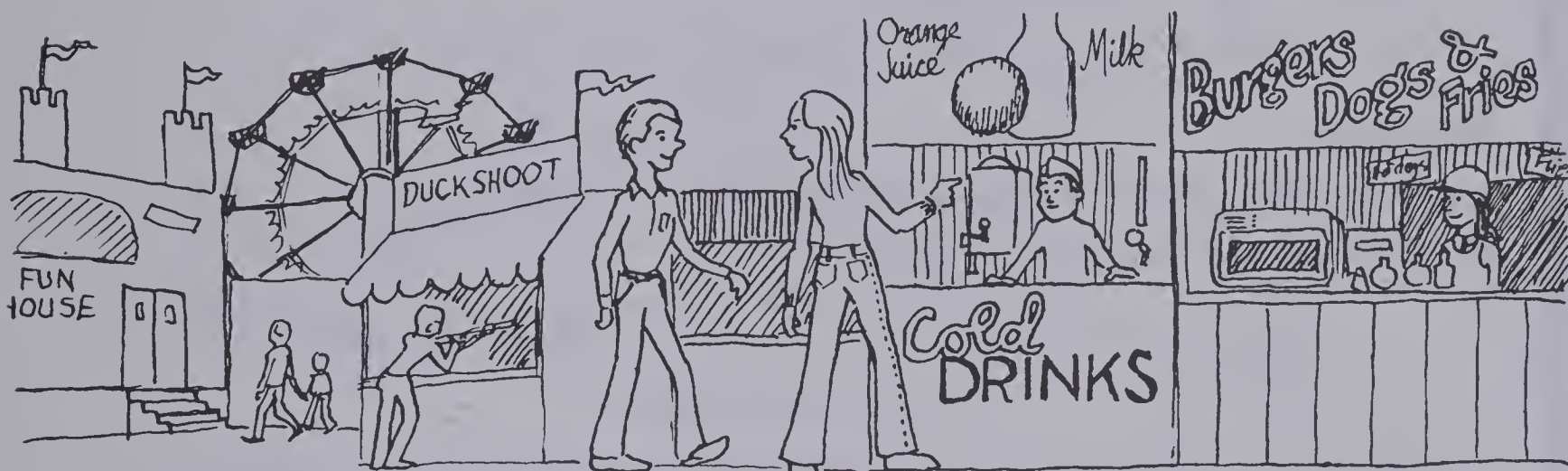
- Mrs. Jamison wishes to paint a table and chair. She found tins of red, yellow, and blue paint in the basement. Draw the 9 different color combinations for painting the table and the chair.



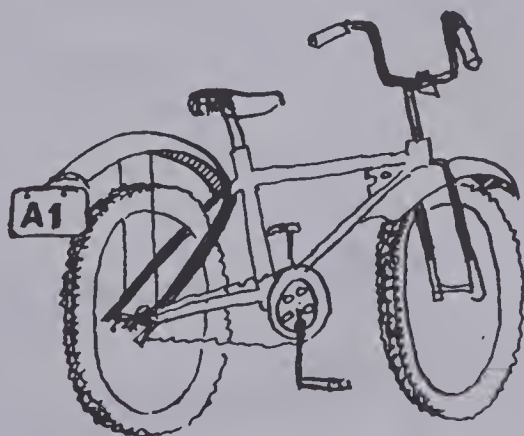
- Jolene has candies in the shape of a triangle, a square, and a circle. She wants to know the number of ways she could arrange the candies in a row, always using all 3 candies. Make a diagram to show all the different ways the candies can be arranged.

One way:   

3. Mary has a one-dollar bill, a five-dollar bill, and a ten-dollar bill. She puts them into her purse one at a time. List all the ways Mary can put the bills into her purse.
4. At the county fair, one concession booth was selling milk and orange juice. Another booth was selling hot dogs, hamburgers, and French fries. How many different snacks are possible if the snack includes one item from each concession?



5. A repairman replaced some of the tiles in the kitchen of a house. He put down 121 tiles. When the repairman had finished the job, he noticed that the new tiles formed a geometric shape that had the same number of rows and columns. How many tiles did each row and column have? What shape was the figure?
6. Licences for bicycles use the letters A, B, and C and the digits 1, 2, and 3. All of the licences start with the letter and are followed by a single letter or a digit. Make a diagram showing all the ways the licences could occur.



7. An ice-cream shop sells 21 different flavors of ice cream and 2 different types of cones. How many different ice-cream cones can be made?

UNIT 5 Reasonable Answers

You should always look at your answers to see if they make sense.

Problem:

A telephone list has an average of 92 names on each page. How many names will there be on 89 pages?

- a. 81 b. 818 c. 8188

Solution:

Use rounding skills to estimate the answer.
Round each number to the nearest 10.

92 rounds to 90.

89 rounds to 90.

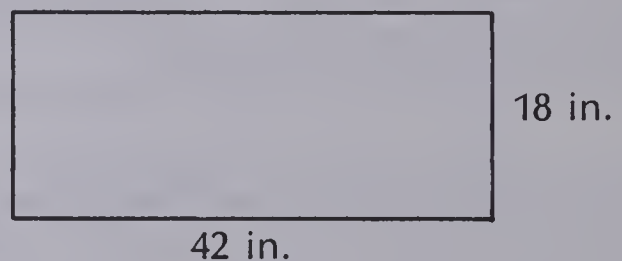
$$90 \times 90 = 8100$$

The most reasonable answer is c. 8188

Choose the most reasonable answer.

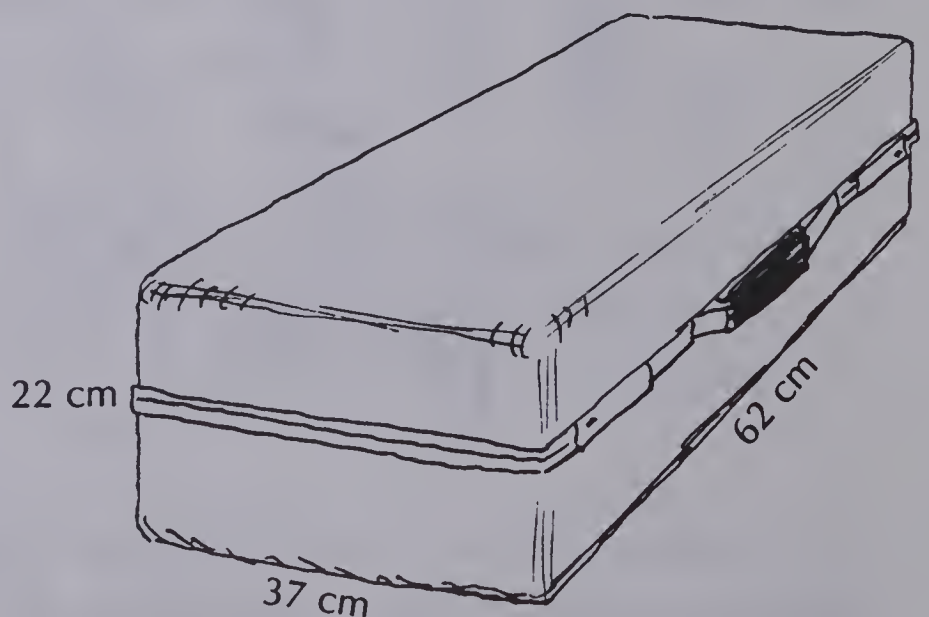
1. What is the area of the figure?

- a. about 80 sq in.
b. about 400 sq in.
c. about 800 sq in.

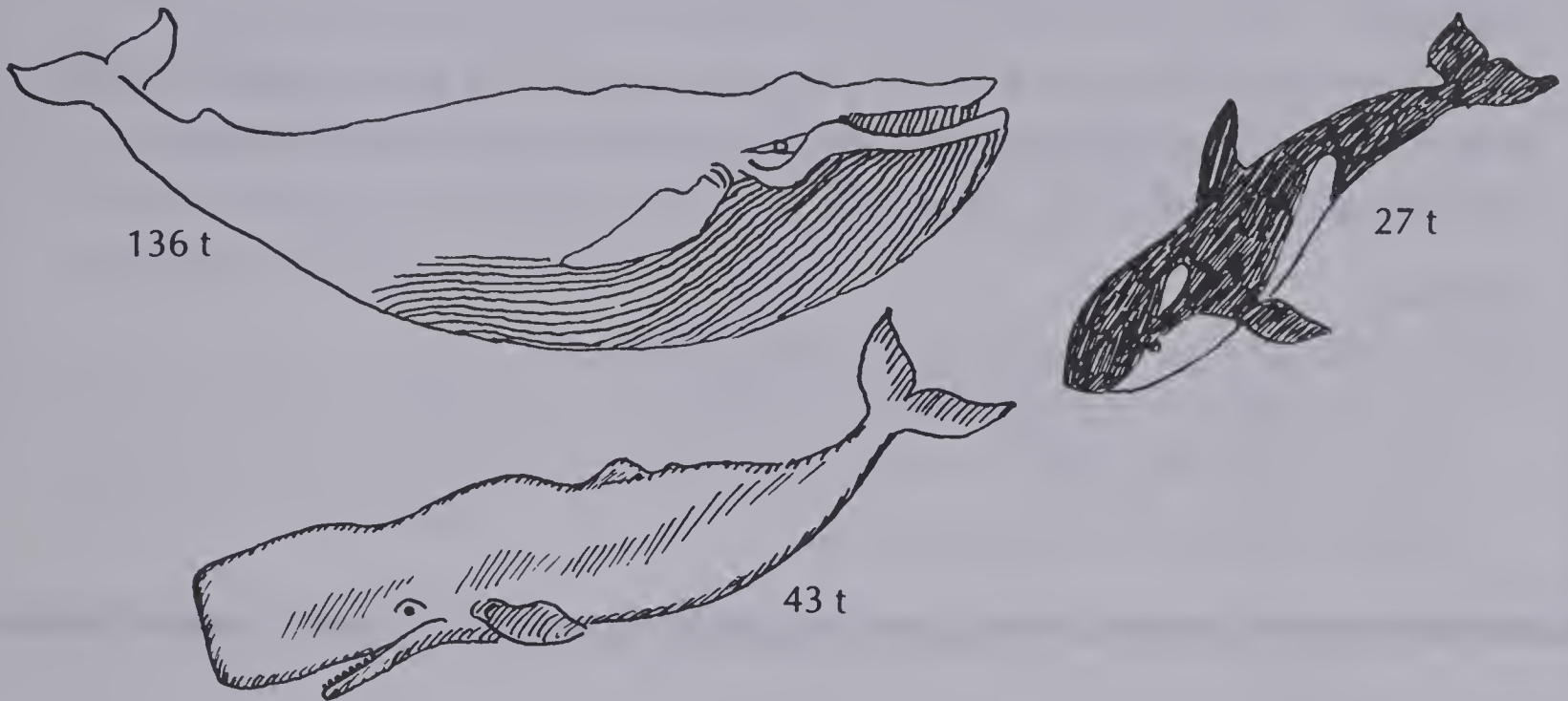


2. What is the volume of the case?

- a. about 48 000 cm³
b. about 480 cm³
c. about 4800 cm³



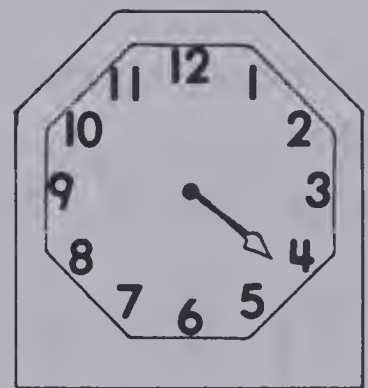
3. What is the total mass of the whales?



- a. about 26 t b. about 210 t c. about 2600 t

4. The big hand has fallen off the clock face. What time is possible?

- a. 4:20 b. 3:50 c. 5:10



5. The chapters in a book average 24 pages each. The book has 17 chapters. About how many pages are there in the book?

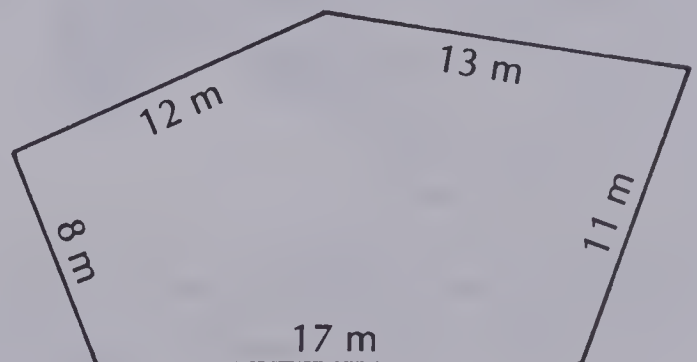
- a. about 40 b. about 250 c. about 400

6. The principal of Pinebrae School ordered 325 new books. The books cost \$5.90 each. What was the total cost of the books?

- a. about \$195 b. about \$1950 c. about \$19,500

7. What is the perimeter of the figure at the right?

- a. about 6 m
b. about 60 m
c. about 600 m



Problem:

Cucumbers are on sale at 4 for \$1.19. Janine wanted to know approximately how much each cucumber costs. She figured it to be \$0.03 each. Is her answer reasonable?

Solution:

Use rounding to get an estimation of the answer.

\$1.19 rounds to \$1.20.

$$\$1.20 \div 4 = \$0.30$$

Janine's answer is not reasonable.

Estimate a reasonable answer.

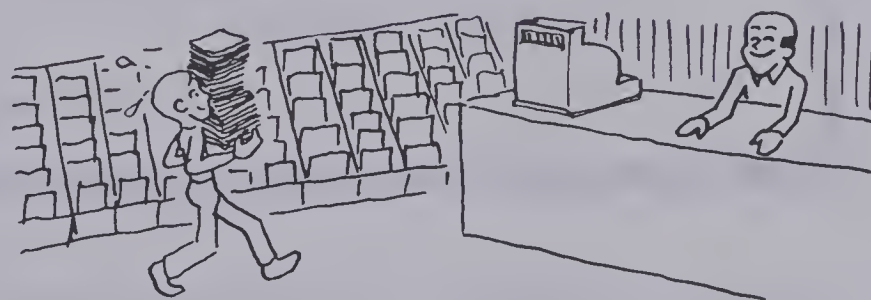
1. The school Winter concert was attended by 374 people the first night and 419 people the second night. Altogether how many people attended the concert on the two nights?



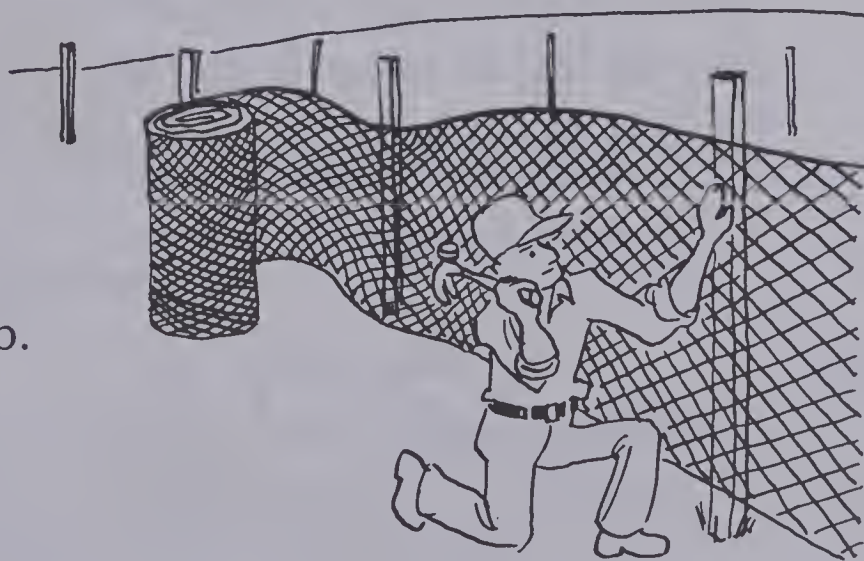
2. The average number of students in each class at Glenhaven School was 31. There were 9 classes in the school. How many students were in the school?
3. The Bentley family drove 412 km on Tuesday, 398 km on Wednesday, and 485 km on Thursday. How far did they drive in all?

4. The attendance for 5 home games of the Gators football team was 1134 people. What was the average attendance for the games?
5. A recent edition of the school newspaper was 9 pages long. How many newspapers could be printed if 576 sheets of paper were available for use?
6. A fully-loaded airplane had room for 432 passengers. On one particular flight, the load was 243 passengers. How many seats were empty on that flight?
7. The Lewis family was going to drive from Bug City to Germsville, a distance of 178 miles. They hoped to make the drive in 3 hours. Mr. Lewis decided he had to average 40 mph to get there on time. Is his estimate reasonable?

8. What is the cost of the record if two are selling at a special price of \$10.95?



9. Marianne bought a record, a tape, and a music book at Hue's Music Shop. She paid \$6.98 for the record, \$4.89 for the tape, and \$4.25 for the book. The clerk charged Marianne \$26.12. Is the clerk's total reasonable?
10. A rectangular playing field measured 31 yards by 18 yards. The groundskeeper was asked to fence in the area. He ordered 100 yards of fencing to do the job. Is his order reasonable?



UNIT 6 Extra Information

Sometimes problems provide more information than is necessary. Ignore the extra information and use only the facts needed to solve the problem.

Problem:

In the annual school all-star football game, the north team scored 11 points in the first half and 14 points in the second half. The south team scored 31 points in the game. How many points did the north team score altogether?

Solution:

The question asks how many points the north team scored in the game.

The facts about the south team are *not* useful.

The facts about the north team:

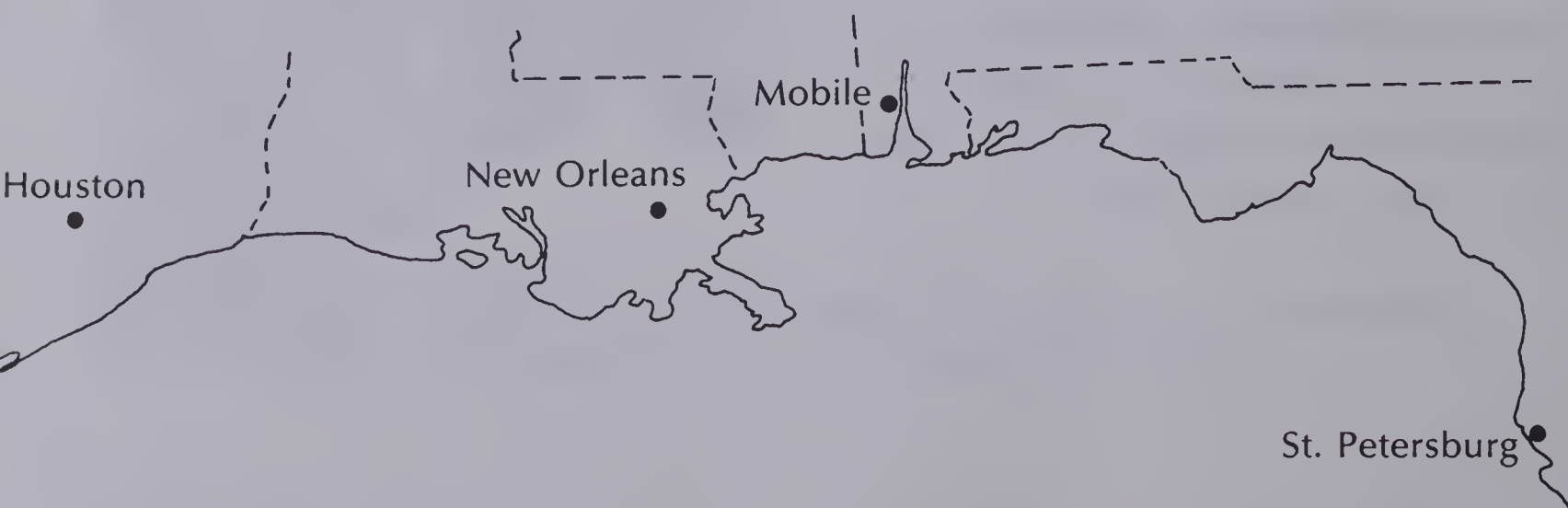
first half: 11 points

second half: 14 points

The north team scored 25 points altogether.

Use only the necessary information to solve the problem.

1. The population of Calgary was 592,743 in 1981, 403,343 in 1971, and 279,062 in 1961. By how much did the population of Calgary increase in 20 years?
2. The driving distance from St. Petersburg to Mobile is 550 miles. The driving distance from Mobile to New Orleans is 142 miles. The driving distance from New Orleans to Houston is 352 miles. What is the driving distance from St. Petersburg to Mobile?



3. The length of a rectangle is 14 units. The width of the rectangle is 6 units. The area of the rectangle is 84 square units. What is the perimeter of the rectangle?

4. The distance along Alberta's eastern border is 1280 km and the perimeter of the province boundaries is 3560 km. How wide is Saskatchewan along the Manitoba border?

5. The northern borders of Alberta, Saskatchewan, and Manitoba combined are 1440 km long. Which prairie province has the shortest northern border?



6. Vitas has two packages of golf balls. Each holds three balls and costs \$3.99. How much does one ball cost?
7. For the school bake sale, Melanie brought 64 oatmeal cookies, 32 brownies, and 24 chocolate cupcakes. Susan brought 48 oatmeal cookies, 48 brownies, and 48 chocolate cupcakes. How many brownies did the two girls bring to the bake sale altogether?
8. The Parkview Tollway charges \$0.50 for a car, \$0.75 for a bus, and \$1.00 for a truck. If 200 cars and 10 buses get on the tollway in one hour, how much money is collected?
9. Mr. Bronson is three times as old as his daughter Sheena. Five years ago he was four times as old as Sheena. Sheena is 15 years old. How old is Mr. Bronson?
10. There are 501 students in Oak Meadow School. Ninety-eight are grade four students, 112 are grade five students, and 89 are grade six students. How many of the Oak Meadow students are not in grade five?

Use only the facts needed to solve the problem.

1. The tourist information office in Battle Center is open from 8:30 to 5:30. One of the office staff members goes for lunch from 11:30 to 12:30 and the other office worker goes for lunch from 12:30 to 1:30. How long is the tourist office open each day?
2. Loretta took her 8 year old brother James and her 10 year old sister Sheila to a matinee show. Tickets were \$2.50 each for the matinee and \$4.00 each for the evening show. How much did Loretta pay the cashier?
3. Jason bought a practice baseball for \$1.99 and a vinyl glove for \$4.99. He paid for the items with a \$10.00 bill. How much did Jason pay for the goods purchased?
4. Two hundred eighty-eight small boxes were to be packed in large cartons. Each carton held 12 small boxes. Workers were to do the packing from 8:00 to 12:00. How many cartons were needed to pack the boxes?
5. A sailing shop has 42 life jackets, 56 rain jackets, and 60 pairs of rubber boots for sale. Each pair of rubber boots costs \$39.95. What is the total value of the shop's supply of boots?
6. Small size glass tumblers sold for \$0.35 each. Large size tumblers sold for \$0.75 each. How much did one dozen large tumblers cost?
7. A weekend movie schedule listed the following times for the showing of a new movie. Patrick and Penny want to go to the movie on Sunday evening. They want to be back at home by 10:00 P.M. What would be the best time for them to go to the movie?

Friday:	2:00 P.M., 4:30 P.M., 7:00 P.M., 9:30 P.M.
Saturday:	12:00 P.M., 2:30 P.M., 5:00 P.M., 7:30 P.M., 10:00 P.M.
Sunday:	2:00 P.M., 4:30 P.M., 7:00 P.M., 9:30 P.M.



On a large farm, the farmer's wife milks the cows each day. After milking the cows, she feeds the goats and the pigs. Then she takes care of the apple trees and the berry bushes. She also has young children to look after.

One of the farmer's children, a boy, is old enough to help out with the farm chores. Every day the boy collects the eggs the chickens laid. He also sees that the horses and the mule have what they need. The family's dog follows him around as he does his chores.

The farmer himself is quite busy. He takes care of the corn, potato, and onion fields. Every day, except Sunday he gets up with sun to begin his work.

To keep the farm going, each member of the farmer's family who is old enough must work. When they get older, two more sons and a daughter will be able to help out too.

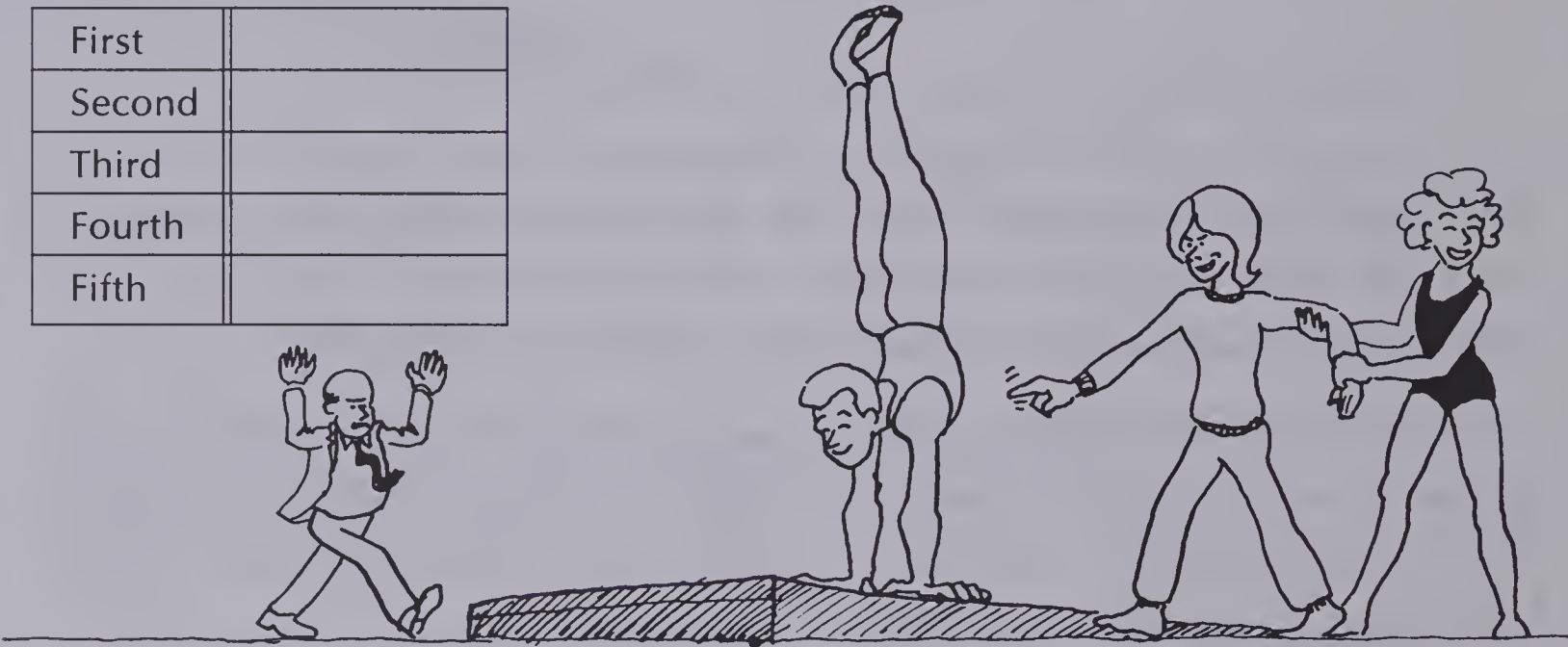
8. How many different kinds of animals does the farmer keep on his farm?
9. How many children does the farmer have?
10. What kinds of foods does the farmer grow?

UNIT 7 Review Problems

Solve.

1. Five teams participated in a school gymnastics competition. Garden Site school finished ahead of Braegrove and Ferndale, but behind Prime Oak and Spruce Glen. Spruce Glen did not win the competition. Ferndale finished just ahead of Braegrove. What was the order of finishes in the competition?

First	
Second	
Third	
Fourth	
Fifth	



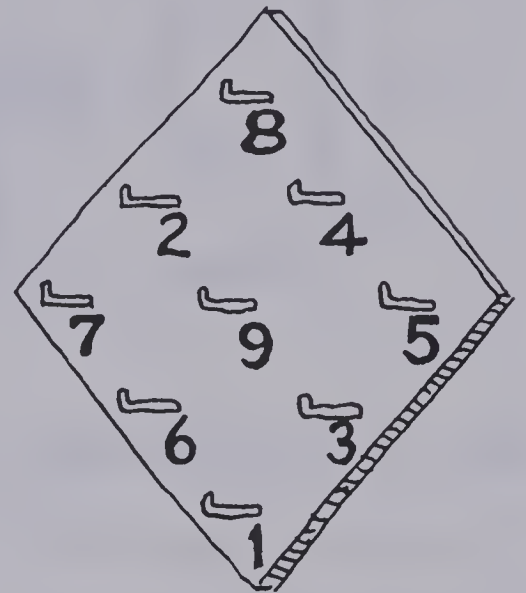
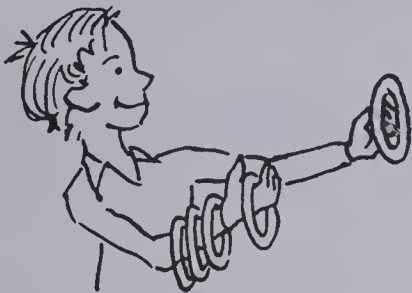
2. The Tigers won the city championship. They defeated the Lions and Cheetahs. The Cheetahs defeated the Lynx before losing to the Tigers. Which teams played each other and who won each game?
3. Anil, Chas, Jenny, and Lora are in grades 3, 4, 5, and 6 in school. Lora has been in school longer than Anil. Jenny has been in school fewer years than Chas. Anil has been in school more years than Chas. Which grade is each student now taking?

	Student
Grade 6	
Grade 5	
Grade 4	
Grade 3	

4. At the school bake sale, Sally made \$17.03. She took in 93 coins to make this amount of money. Which coins did she get to make \$17.03?

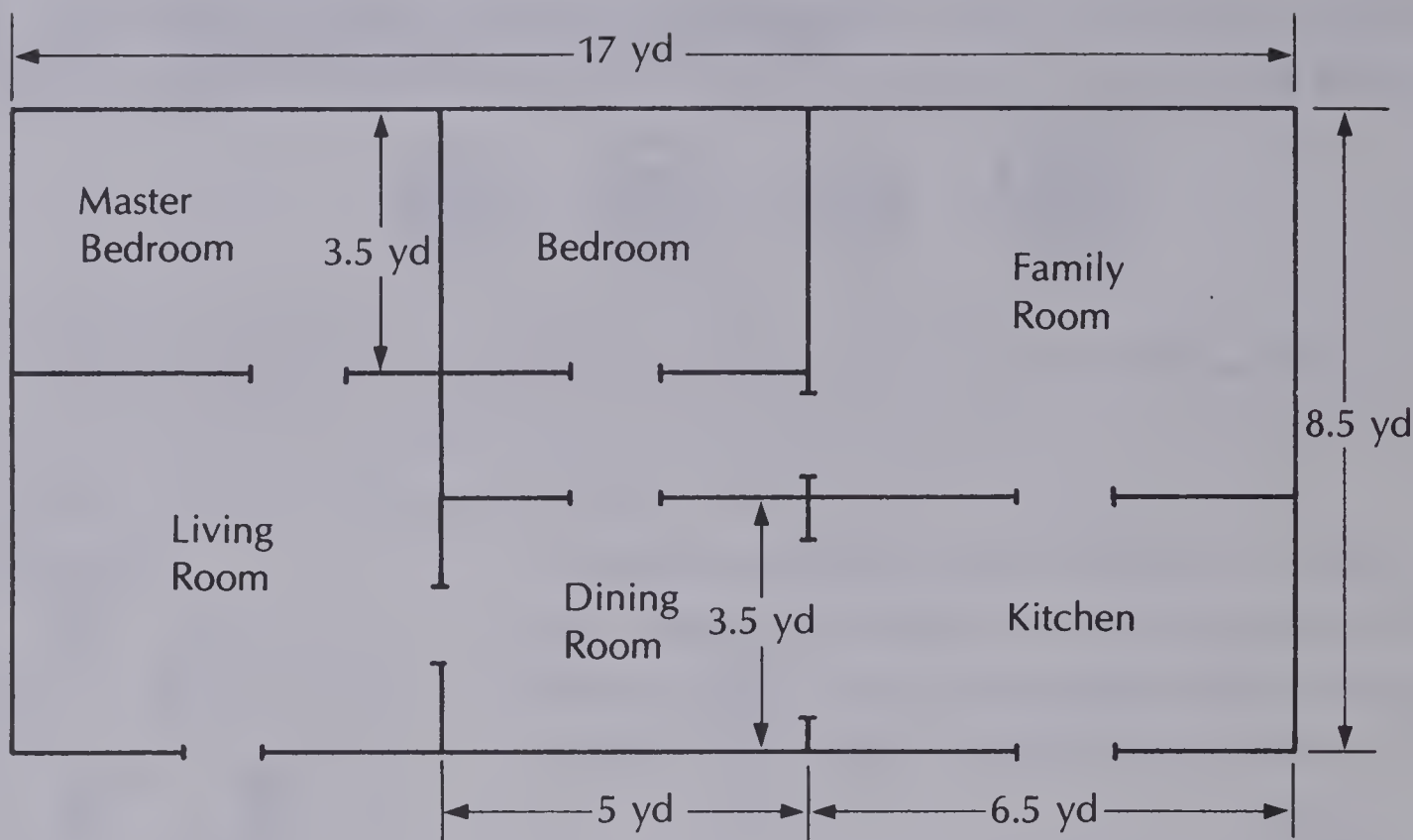


5. The sum of three consecutive counting numbers is 75. What are the numbers?
6. A group of students were playing ring toss. Each person threw 7 rings at the target. All of Jack's rings landed on a hook. His score was 32. What is one possible way Jack scored?



Choose the operation that will solve the problem. Then solve the problem.

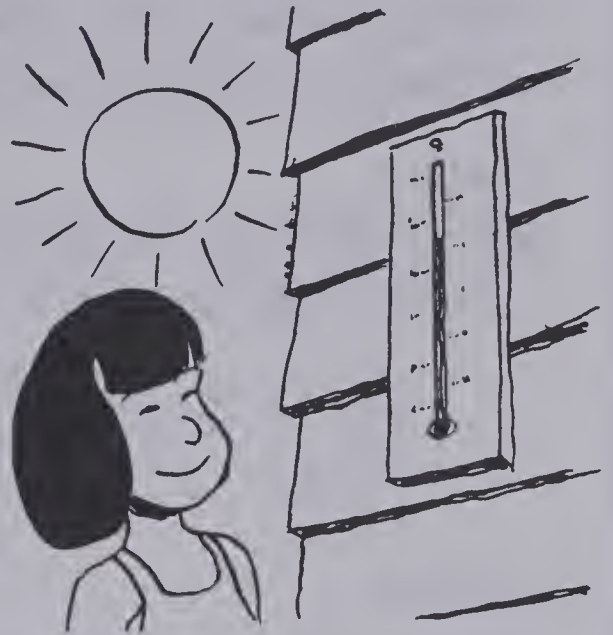
7. The Gonzales' bought their son Ken a camera for \$89.94. This price was 3 times as much as the price of a cheaper camera. What was the price of the cheaper camera?
- a. $\$89.95 \times 3$ b. $\$89.95 \div 3$ c. $\$89.95 > 3$
8. There were 14,904 people in attendance at a country fair. Of this number, 8749 were men. How many of the spectators were not men?
- a. $14,904 + 8749$ b. $14,904 - 8749$ c. $14,904 > 8749$
9. One third of the 57 band members play brass instruments. How many band members play brass instruments?
- a. $\frac{1}{3} \times 57$ b. $3 + 57$ c. $57 - 3$



How many square yards of carpet would be needed to cover:

1. the dining room floor?
2. the living room floor?
3. the master bedroom floor?
4. the family room floor?
5. A refreshment stand sells hamburgers and hot dogs. One topping can be added without extra charge. These toppings are catsup, mustard, pickles, and onions. How many different hamburger and hot dog combinations can be made without an extra charge?
6. Grace, Natalie, and Robert couldn't decide whether to go to a movie, a ball game, or swimming. In many different groupings can they go if they don't necessarily go together?
7. Mrs. Garcia has a white, a pink, a tan, and a yellow sweater. She also has a navy, a brown, and a black skirt. How many different outfits can she wear?

8. The number of families in Larster is 8122. The average family size is 4.3 persons. What is the population of Larster?
- a. about 320 b. about 3200 c. about 32,000
9. The scale on a thermometer is worn and cannot be read. It is a warm, sunny day. What is reasonable for the temperature under this condition?
- a. 15°C b. 28°C c. 40°C
10. Mr. Wu bought 6 muffins which cost \$0.68 each. The clerk charged him \$3.68 for the muffins. Is the clerk's total reasonable?
11. The school choir put on a special performance for parents and friends. Tickets to the concert were \$0.75 each. For the performance, the choir stood in 4 rows with 13 students in each row. The concert was attended by 186 people. How many students were in the choir?
12. Jillian, Nicky, Sam, and Ira delivered flyers for a grocery store. Jillian and Nicky delivered their flyers after school on Monday. Sam delivered his before school on Tuesday. Ira delivered his Tuesday after school. Each of the students was given the same number of flyers. Altogether they distributed 1032 flyers. How many did each student deliver?
13. Bananas cost \$0.98/kg and grapefruits are 3 for \$0.99. What is the total cost of 0.5 kg of bananas?



UNIT 8 Number Patterns

Finding a pattern often helps to solve a problem. Using a chart or table may help you find the pattern.

Problem:

What is the pattern rule used? Which numbers should be colored in the last two squares?

1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
4	8	4	8	4	8	4	8	4	8	4	8	4	8	4	8

Solution:

The pattern rule is the sum of the numbers in each succeeding square is one more than the previous square.

The last two squares should be:

1	2	Sum = 6	1	2	Sum = 7
4	8		4	8	

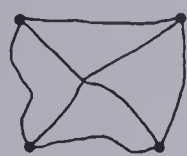
Copy and continue the pattern on the unshaded figures.

1.	4	8	4	8	4	8	4	8	4	8	4	8	4	8	4	8	4	8
	16	32	16	32	16	32	16	32	16	32	16	32	16	32	16	32	16	32

2.	1	3	9	1	3	9	1	3	9	1	3	9	1	3	9	1	3	9
	1	3	9	1	3	9	1	3	9	1	3	9	1	3	9	1	3	9

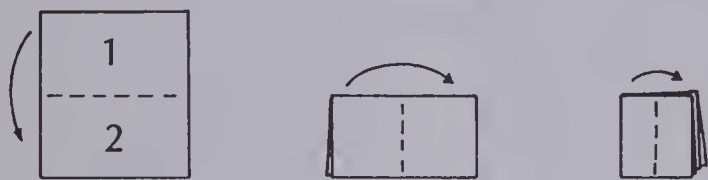
3. Devise a similar shading pattern in a set of square or rectangular grids.

4. One road will connect 2 cities, but it may take 3 roads to connect 3 cities. Find a pattern to determine how many roads might be needed to connect 10 cities.

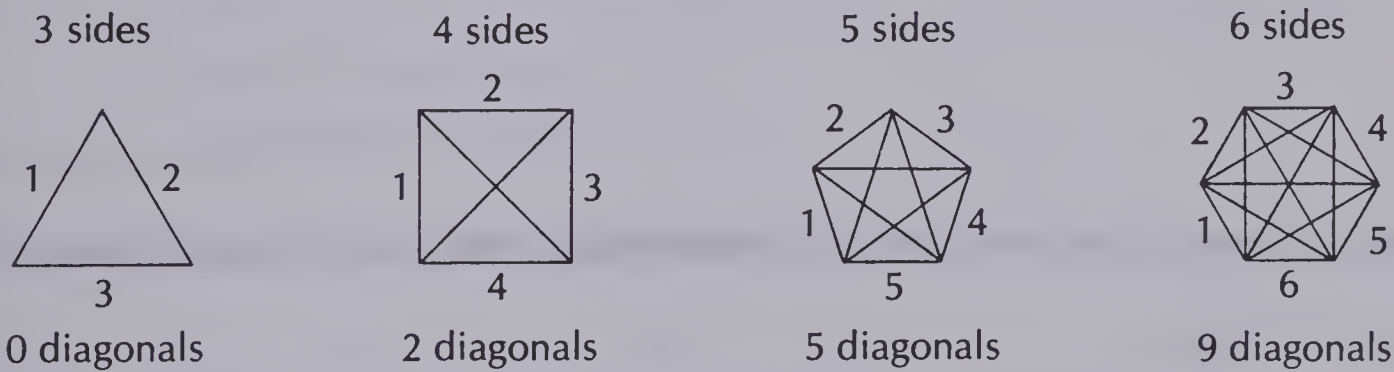


Cities	2	3	4				
Roads	1	3					

5. A square piece of paper is folded in half; then the folded paper is folded in half; and so on. How many sections of paper are there after the sixth fold? Try it!



6. How many diagonal lines can be drawn inside a figure with 10 sides?



Continue each sequence.

7. 5, 6, 8, 11, , , ,

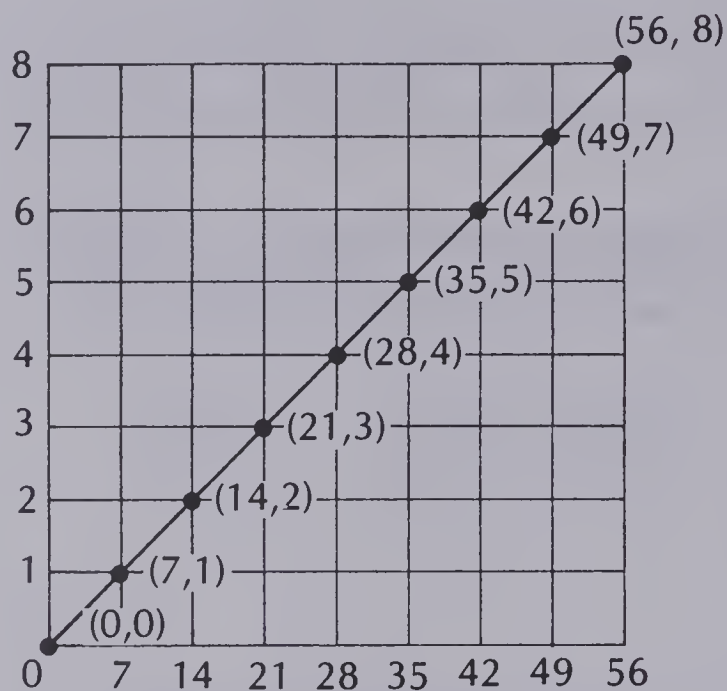
8. 3, 6, 12, 24, , , ,
9. 12.8, 23.7, 34.6, 45.5, , , ,

10. 10, 11, 9, 12, , , ,
11. $1, 2\frac{1}{2}, 4\frac{1}{4}, 8\frac{1}{8}, , , ,$

12. $3 \times 36 = 108$
 $6 \times 36 = 216$
 $9 \times 36 = 324$
 $\times 36 =$
 $\times 36 =$
 $\times 36 =$

Problem:

What is the rule for forming the ordered pairs?

**Solution:**

The chart helps you see the rule.

Rule: $\div 7$	
in	out
0	0
7	1
14	2
21	3
28	4
35	5
42	6
49	7
56	8

The rule is to divide each number by 7.

Complete the charts.

1.

Rule: $\div 4$	
in	out
56	
36	
20	
0	

2.

Rule: $+4, \times 3$	
in	out
0	
2	
5	
9	

3.

Rule: $\times 2, -1$	
in	out
2	
8	
15	
23	

4.

Rule:	
in	out
10	30
20	60
30	90
40	120

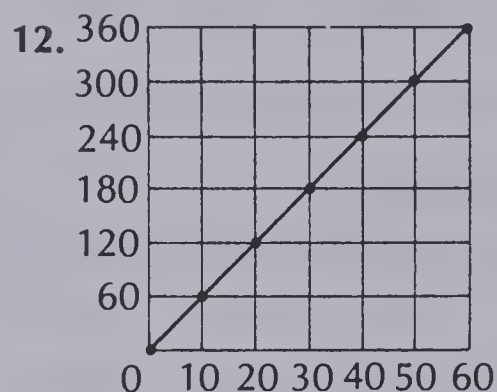
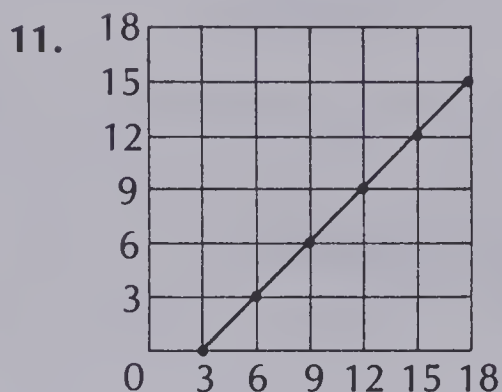
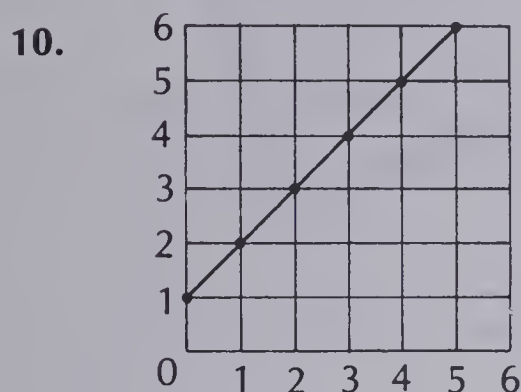
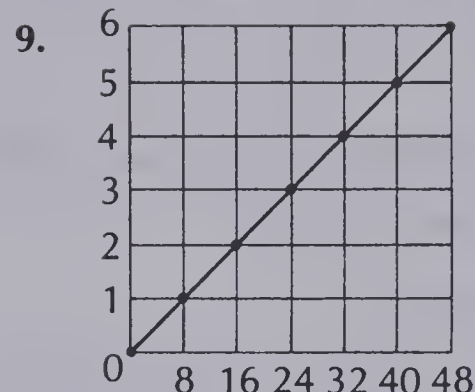
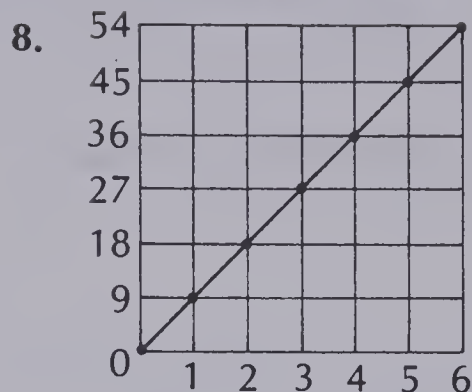
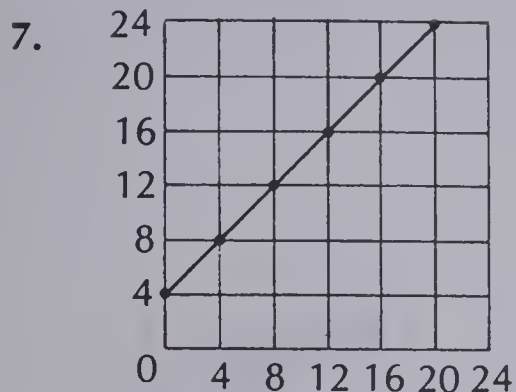
5.

Rule:	
in	out
225	9
200	8
175	7
150	6

6.

Rule:	
in	out
1	9
2	12
3	15
4	18

What is the rule?



Complete the pattern.

13. (1, 2) (2, 4) (3, 6) (4,) (5,) (6,)

14. (3, 0) (6, 3) (9, 6) (12,) (15,) (18,)

15. (2, 1) (4, 2) (6, 3) (8,) (10,) (12,)

16. (1, 8) (2, 7) (3, 6) (4,) (5,) (6,)

17. (1, 4) (2, 7) (3, 10) (4,) (5,) (6,)

18. (1, 3) (2, 7) (3, 11) (4,) (5,) (6,)

19. (6, 10) (5, 12) (4, 15) (3,) (2,) (1,)

20. (1, 2) (2, 4) (3, 8) (4,) (5,) (6,)

21. (1, 7) (2, 10) (3, 13) (4,) (5,) (6,)

22. (1, 2) (2, 5) (3, 10) (4,) (5,) (6,)

23. (2, 18) (4, 16) (6, 14) (8,) (10,) (12,)

24. (2, 20) (4, 16) (6, 12) (8,) (10,) (12,)

UNIT 9 Using a Calculator

A calculator may be used to check the accuracy of an estimate.

Problem:

Add 1982, 4306, and 6157.

Which is the best estimated sum?

- a. 11,000 b. 12,000 c. 14,000

What is the exact sum?

Solution:

Use rounding skills to estimate the sum.

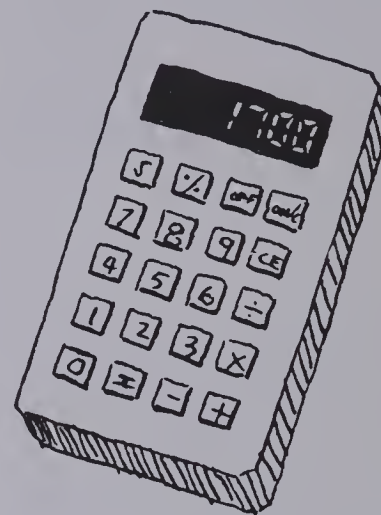
1982 rounds to 2000.

4306 rounds to 4000.

6157 rounds to 6000.

The best estimated sum is 12,000.

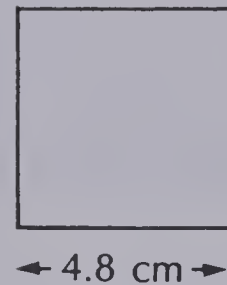
The exact sum found by using a calculator is 12,445.



Choose the best estimate. Then use a calculator to find the exact answer.

1. Is the sum of 3648, 7099, 5821, and 8430 about 23,000, 25,000, or 26,000? What is the exact sum?
2. Is the difference between 43,927 and 28,397 about 5000, 13,000, or 16,000? What is the exact difference?
3. Is the product of 563 and 71 about 40,000, 35,000, or 4000? What is the exact product?
4. Is the quotient of 9044 and 28 about 4000, 3000, or 300? What is the exact quotient?

5. Is the area of the square about 16 cm^2 , 25 cm^2 , or 2500 cm^2 ? What is the exact area?

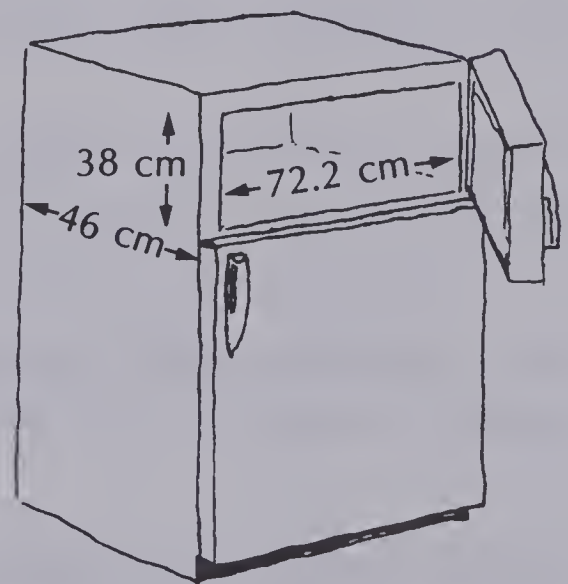


6. Mrs. Wilson can buy 10 of Brand X napkins for \$2.79. She can also buy 3 of Brand Y napkins for \$0.87. *Estimate* the savings in buying 30 of the cheaper brand. What is the actual savings?

7. Jack took \$50.00 to the store to buy some clothes. He wanted 3 shirts at \$10.25 each; 2 pair of socks at \$2.95 each; and 1 pair of pants at \$12.99. *Estimate* to see if he had enough money for these purchases. What is the amount of money he would spend?

8. A 1 quart bottle of soda costs \$1.29. A half-gallon bottle of the same brand of soda costs \$2.39. *Estimate* the savings of buying a half-gallon of soda the cheaper way. What is the exact savings?

9. Is the volume of the refrigerator freezer about 1200 cm^3 , $12,000 \text{ cm}^3$, or $120,000 \text{ cm}^3$? What is the exact volume?



10. Under Plan A, a car rental firm charges \$14.95 a day plus 20¢ per mile driven to rent a car. Under Plan B, it charges \$19.95 a day with no charge for miles driven. Mr. Frank plans to drive 42 miles a day for 5 days. *Estimate* the savings to Mr. Frank in using the cheaper plan. What are the actual savings?

Problem:

Find a number, which when multiplied by itself, has a product of 625.

Solution:

Use a calculator to experiment with possible answers.

$$\boxed{3} \boxed{0} \times \boxed{3} \boxed{0} = 900$$

30 is too large.

$$\boxed{2} \boxed{0} \times \boxed{2} \boxed{0} = 400$$

20 is too small.

Hint:

The number must be between 20 and 30.

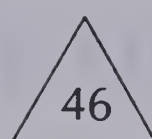
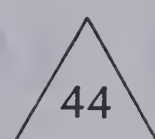
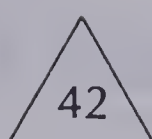
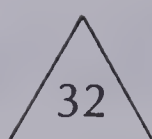
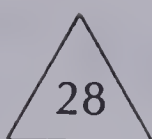
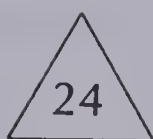
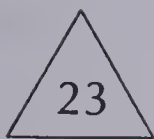
The product, 625, ends in 5.

$$\boxed{2} \boxed{5} \times \boxed{2} \boxed{5} = 625$$

When 25 is multiplied by itself, the product is 625.

Use a calculator to help solve these problems.

- Find a number, which when multiplied by itself, has a product of 1024.
- Find a number, which when multiplied by itself twice, has a product of 729. $\square \times \square \times \square = 729$
- Find a number, which when multiplied by itself four times, has a product of 243.
- Find a number, which when multiplied by itself three times, has a product of 1296.
- Find a number, which when multiplied by itself, has a product of 15,625.



6. Which two numbers above have a product of 896?
7. Which two numbers above have a product of 1104?

Make a true statement using $<$ or $>$.

8. $5 \times 8 \times 17$ $2 \times 12 \times 28$
9. $293 - 86 + 157$ $22 \times 33 - 352$
10. Find a number which when multiplied by itself is 324.
11. A rectangle is constructed from 1 cm^2 tiles. The rectangle has a perimeter of 24 cm. What are all the possible lengths and widths the rectangle could have? Which length and width has the largest area?



12. All of the additions below had the same sum until one number from each of the additions was switched to another one. Which numbers should be changed so that all additions have the same sum?

a.	2948	b.	4059	c.	7601
	2215		5338		1892
	8529		3160		8046
	<u>+ 6377</u>		<u>+ 9725</u>		<u>+ 3152</u>
	20,069		22,282		20,691

UNIT 10 Using Diagrams

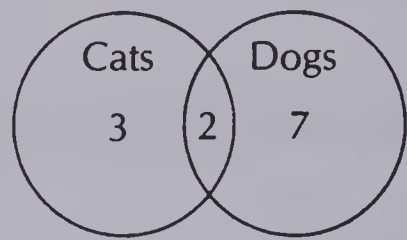
A diagram helps organize facts to make problem solving easier.

Problem:

Twelve students had either a dog or a cat as a pet. Five students had a cat and nine students had a dog. Two of these students had both a cat and a dog. How many students had a dog only?

Solution:

Draw a diagram to help organize the facts.



Two of the students had a dog and a cat. A 2 is put where the circles overlap.

Five students had a cat. Two of these students also had a dog. $3 + 2 = 5$

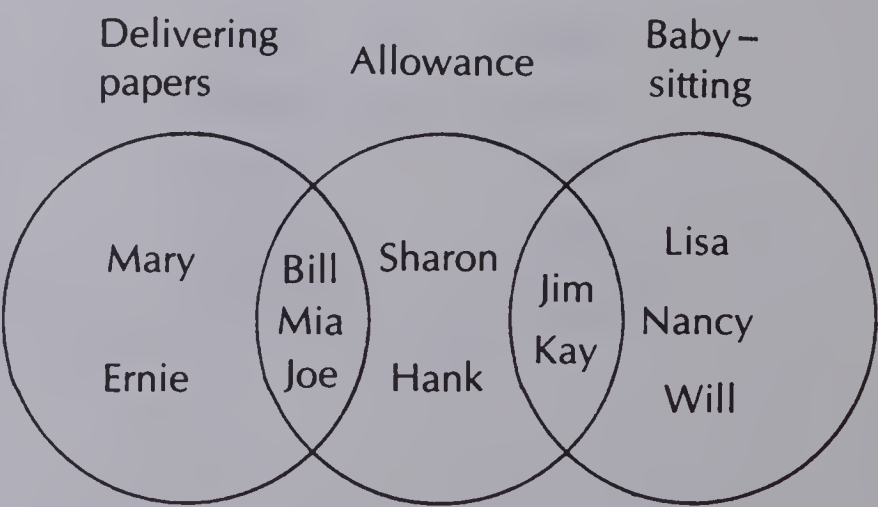
Nine students had a dog. Two of these students also had a cat. $7 + 2 = 9$

There are twelve students in all. $3 + 2 + 7 = 12$

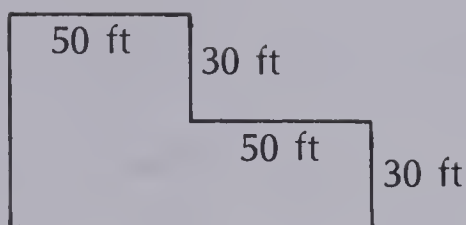
Seven students had only a dog.

Use the diagram to solve the problems

- 1. In what three ways did the students earn money?
- 2. Which students delivered papers and also received an allowance?
- 3. How many students earned money in two ways?

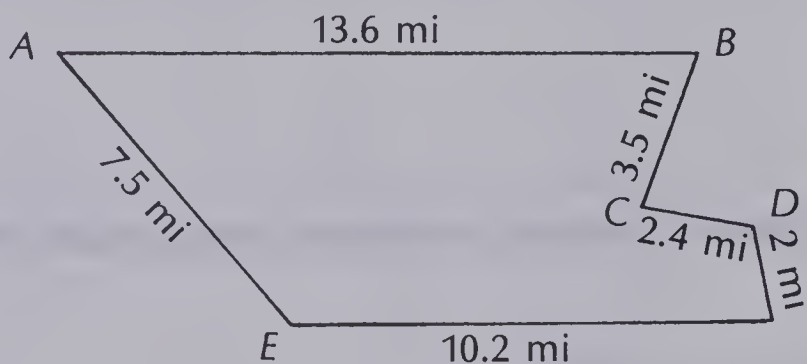


4. Find the perimeter of the lot having the measurement shown in the diagram.



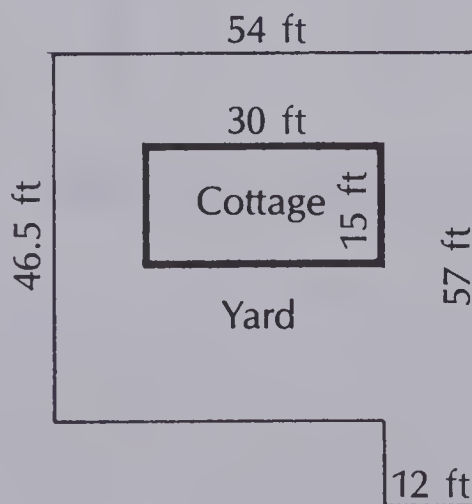
5. Jason lives 3 miles east and 2 miles south of Wichita. Jerome lives 2 miles south and 1 mile west of Wichita. Draw a diagram to find the shortest distance from Jason's house to Jerome's house.
6. In a small high school, 15 students took science and 23 students took math. Six of these students took both science and math. How many students took math and not science?
7. A swimming pool is 15 m long, 4 m wide, and has a volume of 120 m^3 . How deep is the pool if it is the same depth at all points?

8. Find the shortest route from A to D.



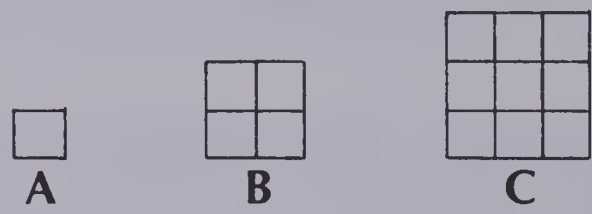
9. Tom rode his bike from his home to a pet shop. He rode 1.7 km south, 1.1 km west, 0.5 km north, and 0.5 km west. Draw a diagram to find whether the pet shop is southeast, southwest, northeast, or northwest of his home.

10. The diagram shows an overhead view of a cottage and its surrounding yard. How many square feet of yard are there?





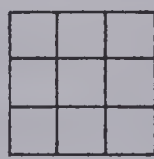
Problem:

How many squares are in each of figures A, B, and C?



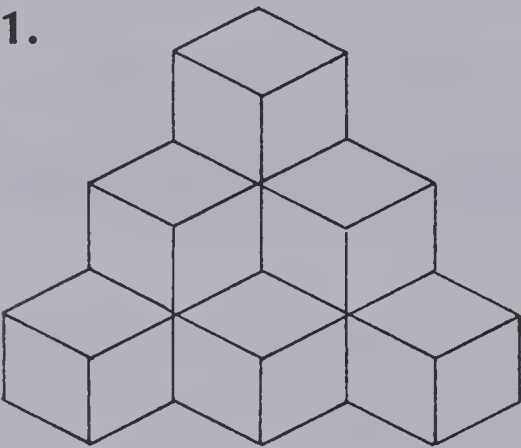
Solution:

Count and record the number of 1 by 1, 2 by 2, and 3 by 3 squares in each figure. Study the pattern.

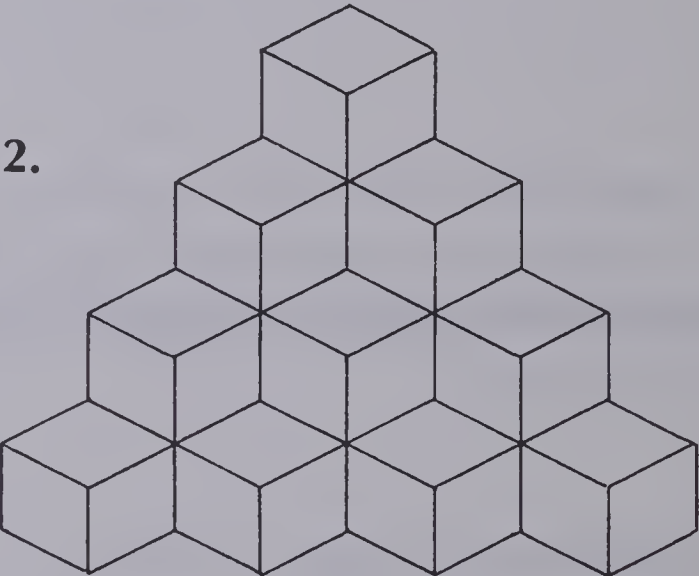
				Total squares
Figure A	1			= 1
Figure B	4	1		= 5
Figure C	9	4	1	= 14

How many cubes?

1.

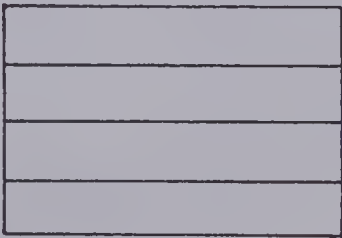


2.

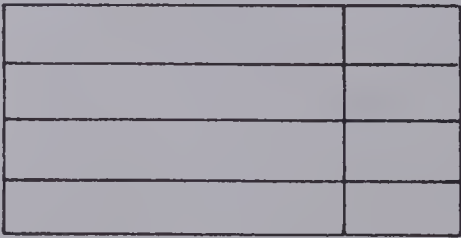


Count the rectangles in the figures.

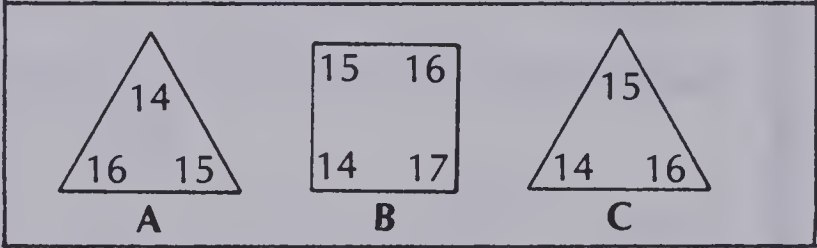
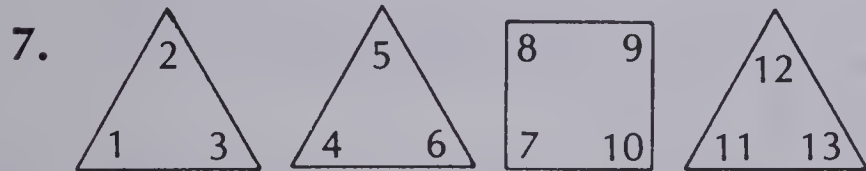
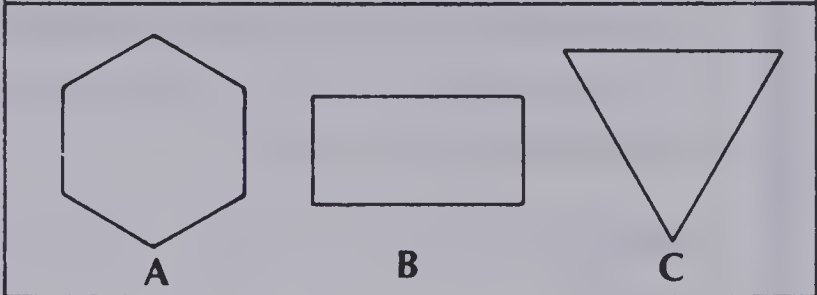
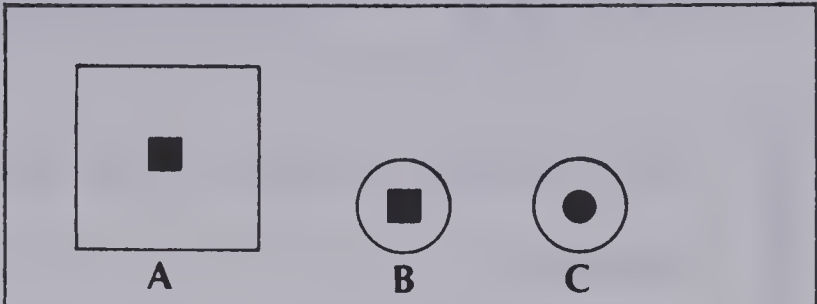
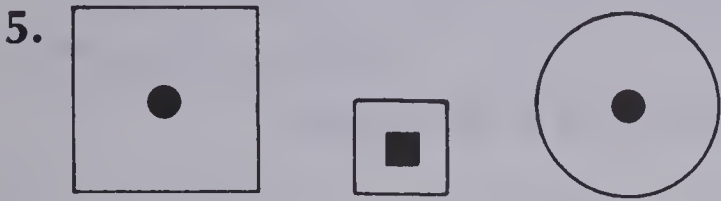
3.



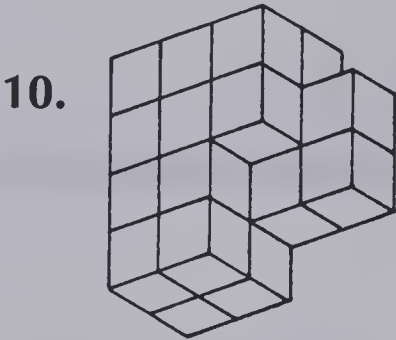
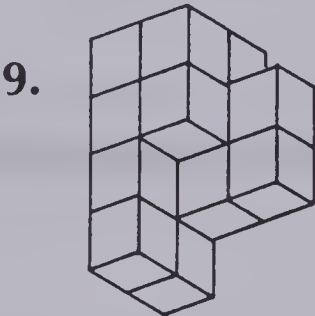
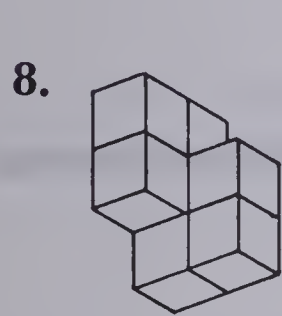
4.



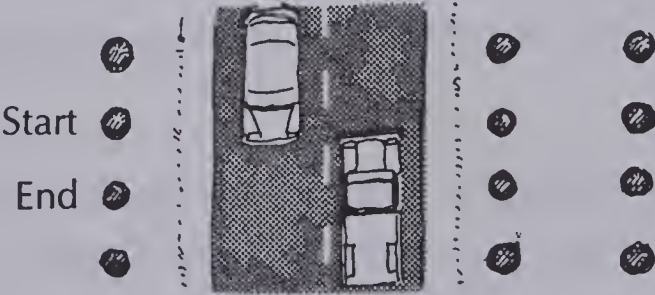
Which figure comes next in the pattern?



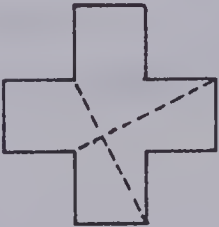
How many cubes?



11. A tree-planting crew was to plant a tree in each hole. The crew wanted to walk the shortest distance possible. Find the shortest path it is possible to walk and still plant a tree in each hole.



12. Copy and cut out the cross pattern. Then cut along the dotted lines. Make a square from the 4 pieces.



UNIT 11 Multi-Step Problems

Some problems require two or three steps in order to be solved.

Problem:

A paper boy paid the publisher \$0.19 for each paper. He sold the papers to his customers for \$0.25 each. How much money did the paper boy make if he delivered 40 papers?

Solution:

Step 1:

Subtract to find out how much money was made on each paper.

$$\$0.25 - \$0.19 = \$0.06$$

Step 2:

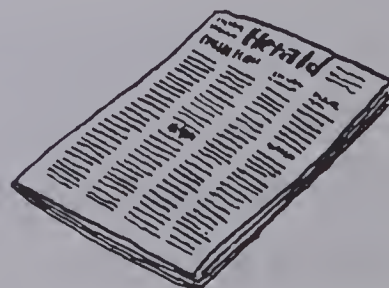
Multiply to find out how much money was made on 40 papers.

$$40 \times 0.06 = \$2.40$$

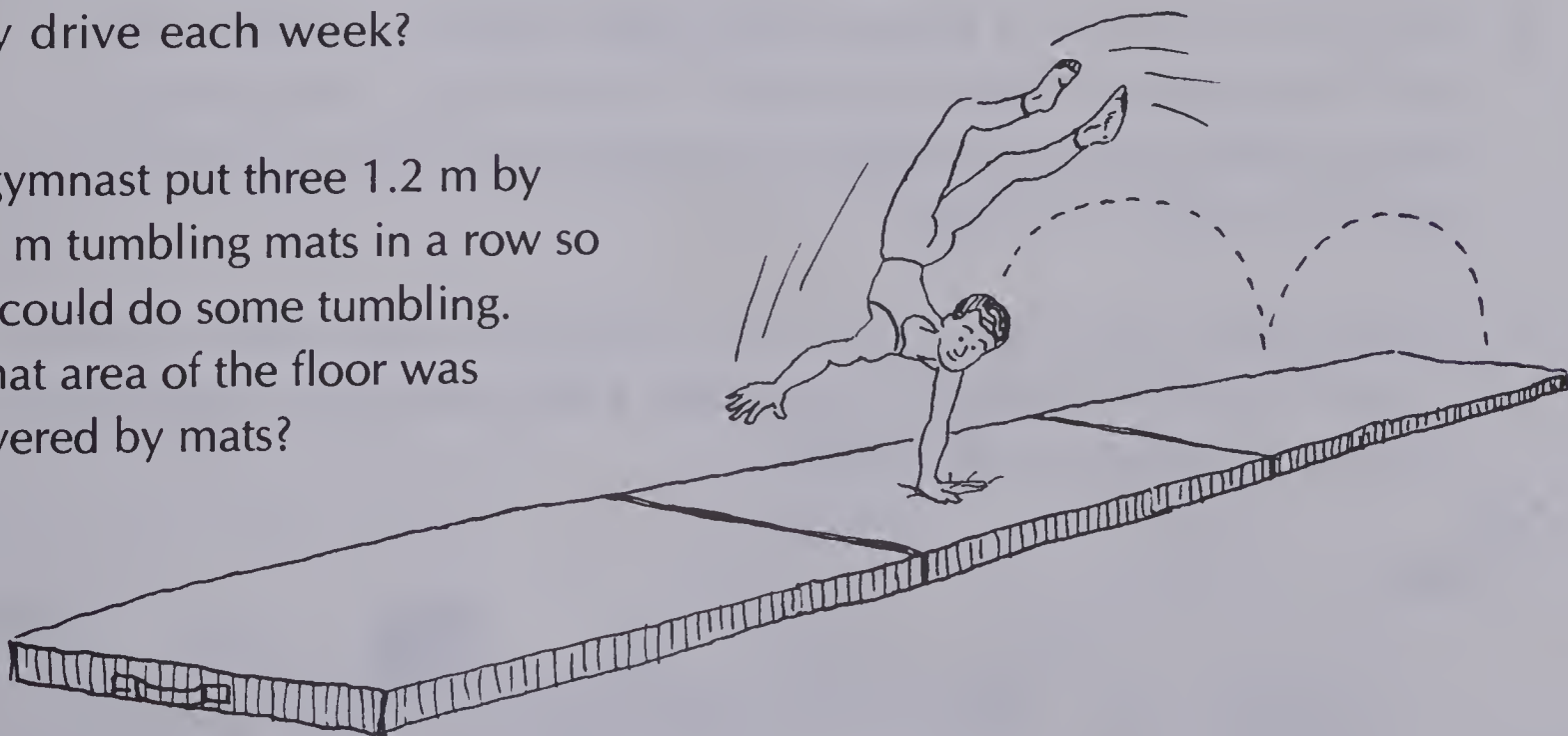
He made \$2.40.

Solve.

1. The school football team scored 1 converted touchdown (7 points) and 1 field goal (3 points) in each quarter of their final game. How many points did the team score in the game?
2. Mr. Smed bagged apples and oranges by the dozen for his store. He had 168 apples and 228 oranges to put in bags. How many bags did Mr. Smed need?
3. A baker sells muffins in packages of 6 for \$3.60 each. How much money does the baker receive from selling 72 muffins?
4. A school newspaper has 12 pages with 4 columns on each page. Each column has 55 lines of print. How many lines of print are in the entire newspaper?



5. Mary Stevens replaced 15 of the ceramic tiles in her workroom with new tiles. Each new tile measured $4\text{ cm} \times 6\text{ cm}$. What area did the new tiles cover?
6. A bakery uses 44 ounces of baking soda in cookie dough every 4 weeks. Cookies are made 4 times a week. How much baking soda does the bakery use every cooking day?
7. Mr. Miller canned strawberries. The strawberries cost him \$16.56 and the jars cost him \$21.36. He made 24 jars of strawberries. How much did each jar of strawberries cost?
8. Dolores can practice 4 different finger exercises on the piano every 5 minutes. How long will it take her to do 20 finger exercises?
9. Mark bought 6 bottles of pop at \$0.99 each. He gave the store keeper 10 empty bottles worth \$0.25 each. How much money did Mark still owe him?
10. The distance from Beechers to Three Hills is 16 miles. Mrs. Hay drove her daughter to Three Hills for skating lessons and then home to Beechers three times a week. How far did Mrs. Hay drive each week?
11. A gymnast put three 1.2 m by 2.4 m tumbling mats in a row so he could do some tumbling. What area of the floor was covered by mats?



Problem:

Russell skated 85 laps in a skate-a-thon. He collected \$0.02 a lap from his father and \$0.05 a lap from his brother. How much money did Russell collect from his father and brother?

Solution:

Step 1:

Multiply to find how much money Russell collected from his father.

$$85 \times \$0.02 = \$1.70$$

Step 2:

Multiply to find how much money Russell collected from his brother.

$$85 \times \$0.05 = \$4.25$$

Step 3:

Add the money Russell collected from his father and brother.

$$\$1.70 + \$4.25 = \$5.95$$

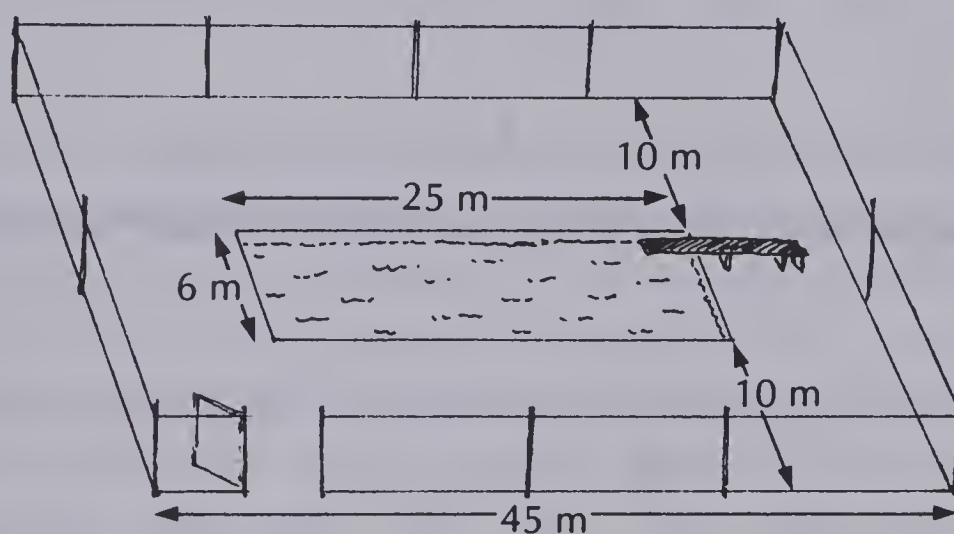
Russell collected \$5.95.

Solve.

1. On a 445 mi trip, Mr. Jackson averaged 45 mph for 225 mi and 55 mph for 220 mi. How long did it take the Jacksons to make the trip?
2. Jennifer worked in a grocery store. She worked 4 hours each on Thursday and Friday evenings. On Saturday, she worked 4 hours more than she worked on Friday. How many hours did Jennifer work each week?
3. In basketball, a field goal counts for 2 points and a free throw counts for 1 point. During one game, Carla scored 8 field goals and 6 free throws. How many points did she score?



4. A hockey player had 38 min in minor penalties (at 2 min each) and 15 min in major penalties (at 5 min each) during the season. How many penalties did she get?
5. On Monday, Tuesday, Wednesday, and Thursday, Brigitte did 75 min of homework and watched television for 45 min each of the nights. How much longer did she spend on homework than watching television on those four days?
6. What is the area of the brick patio surrounding the pool?



7. Gerry and Carl went on an overnight camping trip on their bicycles. On the first day they rode from 12:00 to 2:30. On the second day they rode from 8:30 to 12:30 except for a 1 hour rest. How long did they ride altogether?
8. Jerome has fifteen quarters and nine dimes. How much money does he have?
9. What is the cost of a computer system including a computer, video screen, and two disk drives?

Computer Sale!

Computer\$995
Video screen\$145
Disk drive\$549

UNIT 12 Applications

Problem:

In 10-pin bowling, a score of 300 is a perfect score. Sharon won the championship bowling games of 182, 156, 168, and 154. What was her average score in the 4 games?

Solution:

To find the average, add the scores and divide the sum by the number of scores.

$$182 + 156 + 168 + 154 = 660.$$

$$660 \div 4 = 165.$$

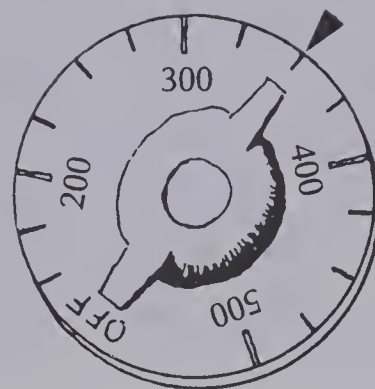
Sharon's average score for the 4 games was 165.

- 1. One of the hottest weeks in Suntown's history was in July, 1936. At that time, the high temperature in Suntown on successive days was 108°, 112°, 103°, 105°, 112°, 98°, and 104°. What was the average temperature for the week?
- 2. What is the total amount of the sale?

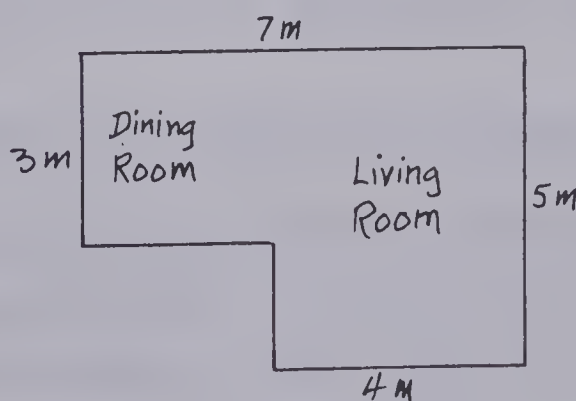
Bellamy Bros.			
		PRICE FOR EACH	TOTAL
1	shirt	\$ 8.95	
3 pr	socks	2.75	
2 pr	pants	19.49	

- 3. A one-way bus ticket on the express bus from Lincoln to Douglas costs \$23.00. A round-trip ticket costs 10% less in each direction. How much does the return trip cost for Mr. and Mrs. Welsh if they go on the express bus?

4. Charles was doing some baking and had the oven set as shown. The next batch of baking was to be done at 425°F . How many more degrees must the oven be heated for the next batch?



5. A weather report gave the daily temperature. The overnight low was -2°C and the high was 11°C . How many degrees difference was there between the low and high temperatures?
6. Jake was asked how many points he had scored in his last three basketball games. He knew he had scored 12 and 23 points in two of the games, but he couldn't remember how many points he had scored in the third game. He did remember his average for the 3 games was 18 points. How many points did Jake score in the third game?
7. Zelda was reading the blueprint for a new building she had designed. The scale said 1 cm represents 5 m. What real length did 4 cm represent?
8. Ms. Karsh was going to buy new carpeting for her living room and dining room. She drew a diagram to help her remember the dimensions of the room. The carpet she wanted was on sale for $\$22.45/\text{m}^2$. How much would the carpet cost her?



TIME ZONES						
Zone	Pacific	Mountain	Central	Eastern	Atlantic	Newfoundland
Cities	San Francisco Seattle	Denver Salt Lake	Chicago St. Louis	New York Newark	Halifax Fredericton	St. John's
West to East		Add one hour for each zone.				
East to West		Subtract one hour for each zone.				

Problem:

How long does it take to fly from San Francisco to Newark?

SWIFT AIRLINE TIMETABLE			
Leaves	Arrives	Flight Number	Stops
08:45	16:15	SWF 55	0

Solution:

a. The flight from San Francisco to Newark goes through 3 time zones.

Add 3 hours.

$$\begin{array}{r} 08:45 \\ + 3 \\ \hline 11:45 \end{array}$$

At 08:45 in San Francisco, it is 11:45 in Newark.

b. The flight arrives at 16:15 Newark time. Subtract to find the length of the flight.

$$\begin{array}{r} 16:15 \\ - 11:45 \\ \hline 4:30 \end{array}$$

The flight takes 4 h 30 min

1. How long does the flight from Chicago to New York take?

Leaves	Arrives	Flight Number	Stops
08:00	16:12	SWF 29	3

- Why does the above Chicago/New York flight take such a long time?
- Mr. Baxter starts work at 08:30 in San Francisco, CA. Mr. Scarlett starts work at the same time in St. John's, Nfld. What time is it on Mr. Scarlett's office clock when Mr. Baxter begins his work?

4. Jane works from 9:30 to 5:00 p.m. Monday through Friday. She gets 30 min for lunch each day. How many hours a week does Jane work?
5. When Cynthia began training for the 400 m run, her best time was 1 minute 5 seconds. Three months later her best time was 51.38 seconds. By how much had she improved her time in the 3 months?

Money comes into a checking account by deposits.

Money is taken out of a checking account by writing checks for payments.

DATE	AMOUNT OF CHECK	AMOUNT OF DEPOSIT	BALANCE
			56.25
April 4	5.95		50.30 ← $\$56.25 - \5.95
April 7		\$25.00	75.30 ← $\$50.30 + \25
April 8	12.60		62.70 ← $\$75.30 - \12.60
April 10	2.88		59.82 ← $\$62.70 - \2.88
April 11	45.09		
April 18		75.00	
April 19	62.13		
April 20	4.25		
April 25		90.00	
April 30	110.50		

Use the above checking account record to solve each problem.

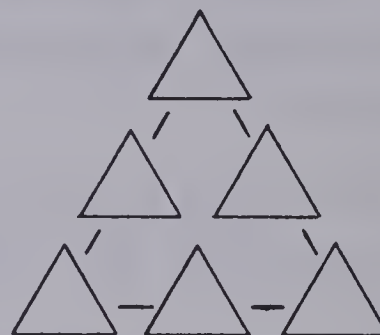
6. Find the balance for:
 - a. April 11 b. April 18 c. April 19
 - d. April 20 e. April 25 f. April 30
7. What is the total amount of money taken out of the account by writing checks?
8. What is the total amount of money put into the account by deposits?
9. Recheck the April 30 balance by: (1) adding the beginning balance to the total amount of money deposited; (2) subtracting the total amount of money taken out by checks. Is your result the same as your answer for question 6f?

UNIT 13 Organizing For Logic Problems

Some problems require several conditions to be true.

Problem:

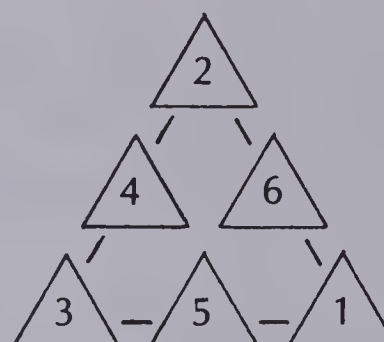
Write the numbers 1 to 6 in the triangles so that the numbers on each side add up to 9. Use each number only once.



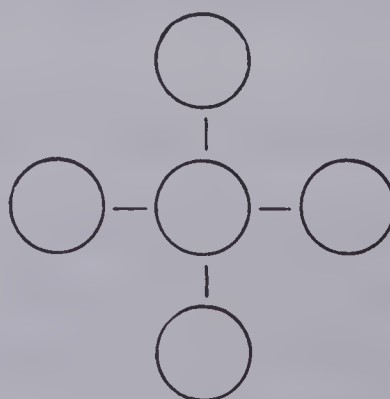
Solution:

The three numbers at the vertices of the large triangle count toward the sum on 2 sides. The large numbers (4, 5, and 6) cannot be used at the vertices since the desired sum is 9.

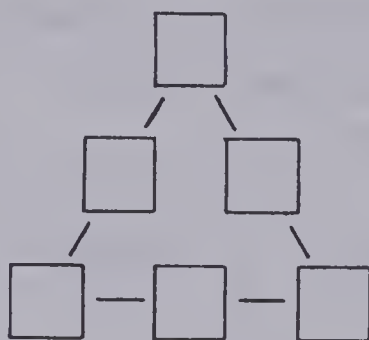
Try 1, 2, and 3 as the numbers at the vertices. Then place 4, 5, and 6 in the empty triangles so the sum in each row is 9.



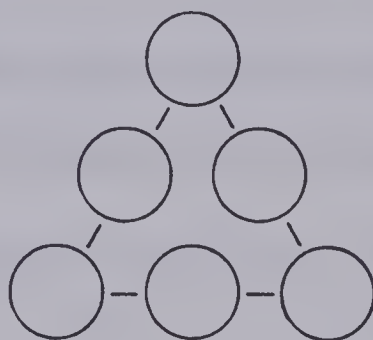
1. Find a number between 70 and 95, that is divisible by 2 and 9 but not by 5.
2. Write the numbers 10 to 14 in the circles so that the sums of the numbers across and down are the same. Use each number only once.



3. Find a number between 625 and 635 that is divisible by 2 and 5 but not by 9.
4. Write the numbers 4 to 9 in the squares so that the numbers in each row add up to 21. Use each number only once.



5. Find all numbers that are less than 195, more than 65, even, and multiples of 9.
6. Write the numbers 4 to 9 in the circles so that the numbers in each row add up to 18. Use each number only once.



7. Find a three-digit numeral that is greater than 125 and less than 150, is a prime number, and is a palindrome (reads the same from both ends, e.g., 121).
8. Find a number that is less than 170, more than 90, and has 3, 5, and 9 as factors.
9. A teacher has 48 peppermint candy canes and 72 chocolate eggs. She wants to put these in small baskets and use them as party favors. What is the greatest number of party favors she can make so that each favor has the same number of candy canes and the same number of chocolate eggs?

A chart may help organize your thinking.

Problem:

Sharon, Bruce, Sandra, and Victor each played on a different school team. The school had teams in softball, volleyball, badminton, and soccer.

- a. The game Sharon played did not use a ball.
- b. Neither Bruce nor Victor played soccer.
- c. Bruce did not play softball.

Solution:

	Softball	Volleyball	Badminton	Soccer
Sharon	x	x	✓	x
Bruce	x	✓	x	x
Sandra	x	x	x	✓
Victor	✓	x	x	x

Statement **a** says the only game which does not use a ball is badminton. So Sharon must have played badminton. Put a check (✓) under badminton across from Sharon's name.

Put an (x) beside every other person's name under badminton.

Put an (x) beside Sharon's name under softball, volleyball, and soccer.

Statement **b** says neither Bruce nor Victor played soccer. Put an (x) beside each name under soccer.

Who played soccer? It must have been Sandra. Put a check (✓) beside Sandra's name in the chart. Put an (x) beside her name under softball and volleyball.

Statement **c** says Bruce did not play softball. Who did? Put a check (✓) beside Victor's name under softball. Put an (x) beside Victor's name under volleyball.

Which game did Bruce play? Put a check (✓) beside Bruce's name under volleyball.

So, Victor played softball; Bruce played volleyball, Sharon played badminton; and Sandra played soccer.

Use a chart to solve the problem.

1. Stacey, Jack, Esther, and Louis have different color hair. One of them has red hair; one has brown hair; one has blond hair; and the fourth has black hair.
- a. One of the girls has brown hair.
 - b. Esther has blond hair.
 - c. Louis does not have red hair.

What color hair does each student have?

	Red	Brown	Black	Blond
Stacey				
Jack				
Esther				
Louis				

2. John, Dave, Rob, and Bill met one another at Scout camp. The boys live in Alberta, Saskatchewan, Ontario, and Newfoundland although not necessarily in that order. Each of the boys has the same number of letters in his name as the number of letters in the abbreviation of the Province where he lives. Bill lives east of Dave and west of John. Where do the boys come from?

	Alta.	Sask.	Ont.	Nfld.
John				
Dave				
Rob				

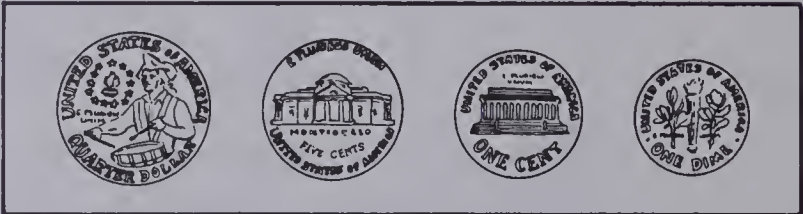
3. Petra, Victor, and Jeff own a dog, a parakeet, and a gerbil although not necessarily in that order. One of the boys owns the gerbil. The owner of the dog lives next door to Petra. Victor does not own the gerbil. Which pet does each person own?
4. The mayor, doctor, and barber of a small town are named Fran Mayor, Paul Doctor, and Stewart Barber, although not necessarily in that order. No person holds a job which is his last name. Paul is not the mayor. What is each person's occupation?

UNIT 14 Review Problems

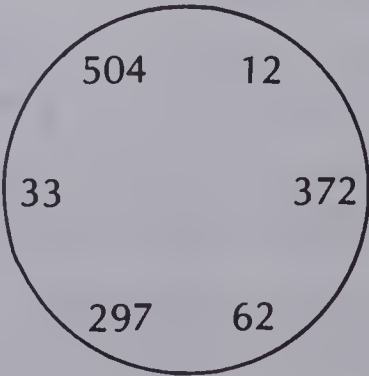
Solve.

- 1. A bicycle can be purchased with a down payment of \$15 and 12 monthly payments of \$7.50. How much altogether is paid for the bicycle? Which expression will answer the question?
 - a. $\$7.50 \times 12 + \15
 - b. $15 \times 12 + \$7.50$
 - c. $\$15 \div 12 + \7.50
- 2. A doctor, lawyer, and teacher met for lunch. Their names are Janet, John, and Kevin. The teacher is a male. Janet is not a lawyer. John is not a teacher. What job does each person have?
- 3. At the Lap-Cheung Produce Market, limes are 99¢ a dozen, lemons are 3 for 59¢; carrots are 39¢ a pound; and asparagus is \$1.75 a pound. What is the cost of 2 dozen limes and 1 pound of carrots?

- 4. If you spent \$0.69 using 19 coins, what coins did you use?



- 5. Find a number between 120 and 135 that is divisible by 3 and 6, but not by 9.
- 6. Find two numbers in the circle whose quotient is 9.



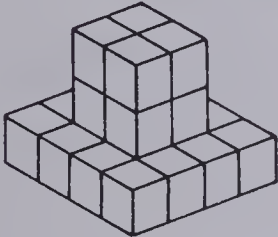
7. What are the missing quotients?
Use a calculator to check your answers.

$100 \div 9$	$=$	11R1
$200 \div 9$	$=$	22R2
$300 \div 9$	$=$	
$400 \div 9$	$=$	
$500 \div 9$	$=$	
$600 \div 9$	$=$	
$700 \div 9$	$=$	
$800 \div 9$	$=$	

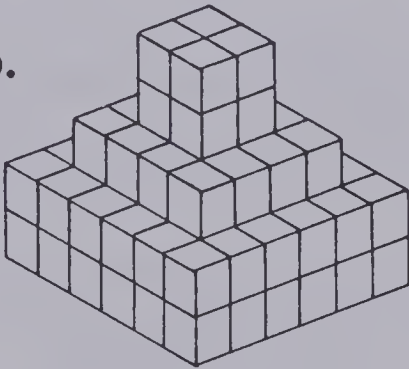
8. Find four consecutive numbers whose sum is 334.
9. Rockacre School has 3 classes each having 28 students and 5 classes each having 31 students. How many students attend Rockacre School?

10. How many cubes are in each stack?

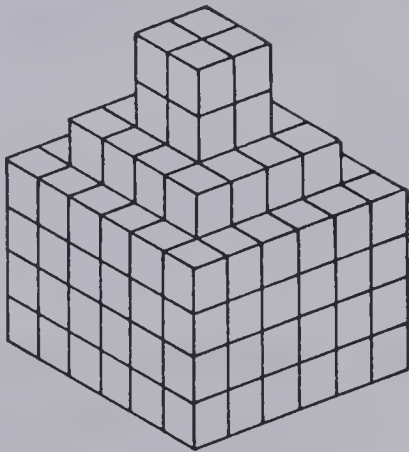
a.



b.

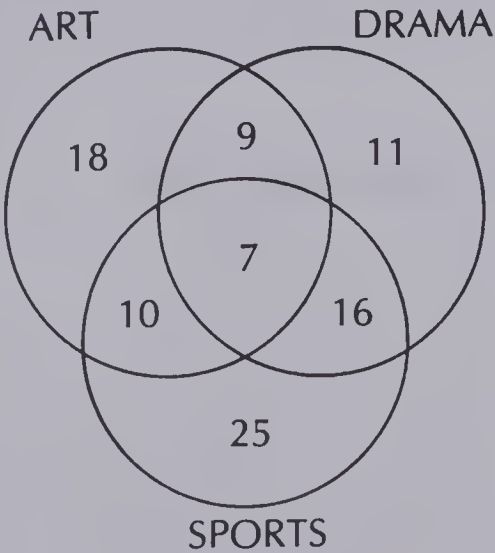


c.



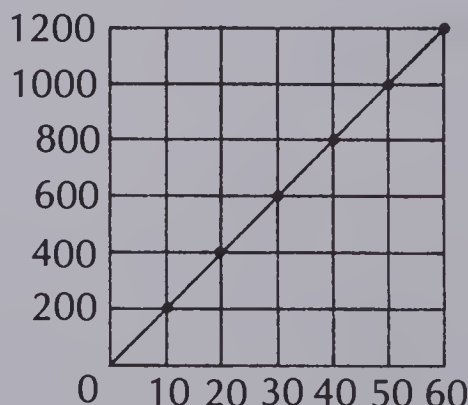
11. A diagram is used to record activities in which students would like to take part.

- a. How many students will take part in sports?
- b. How many students will take part in both art and drama?

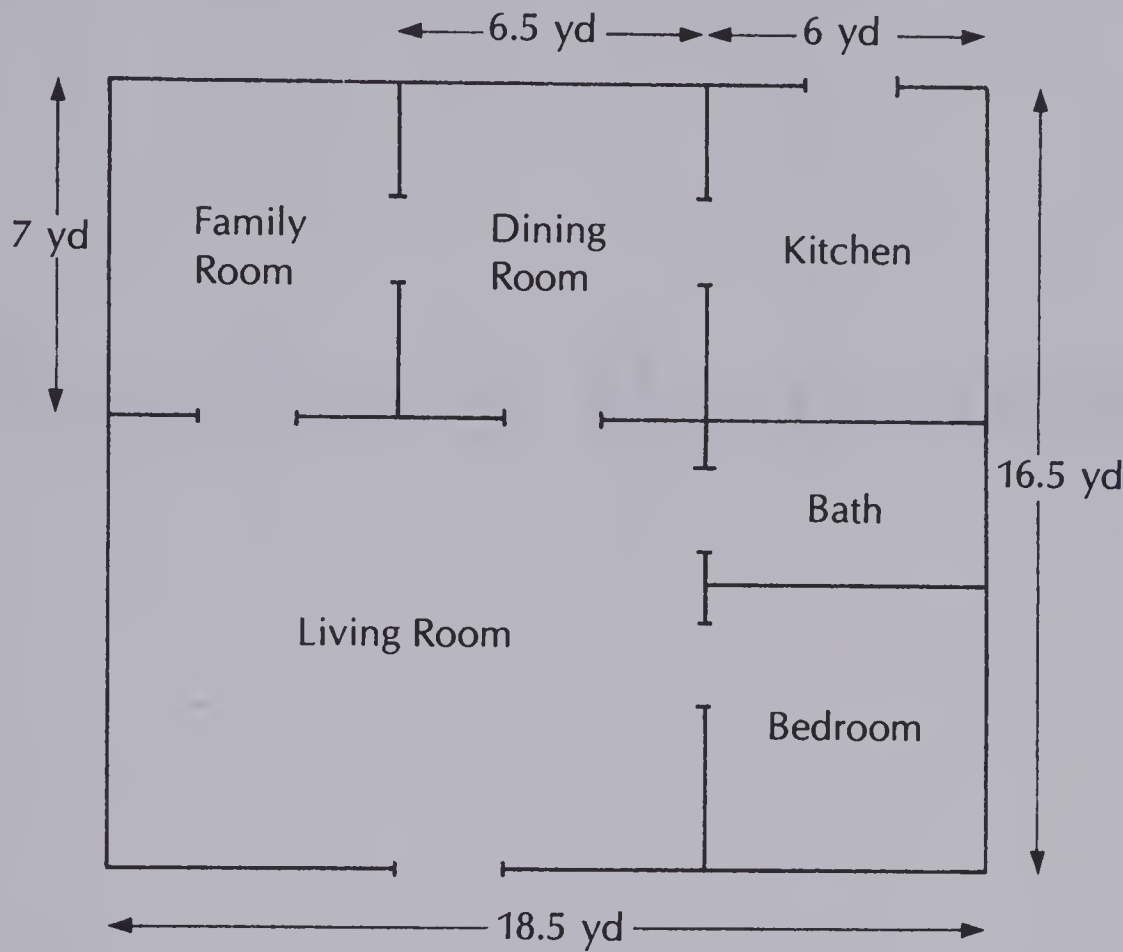


12. Show the number of games each team has won and lost. Put the teams in order from most to fewest wins.
- The Greens have won the same number of games as the Golds.
- The Blacks have won 5 fewer games than the Browns.
- The Blues have won 12 more games than they have lost.
- The Golds have won 31 games which is the number of games the Blacks have lost.
- The Browns have lost 27 games which is 2 more than the Blues have lost and 2 less than both the Golds and Greens have lost.
- The Greens have won 1 game less than the Browns and 4 games more than the Blacks.
13. Julie bought a dress that cost \$29.95. She paid \$1.80 tax. How much change should she get back if she gives the clerk \$35.00?
14. Is the difference between 82,169 and 39,704 about 4000, 40,000, or 50,000? What is the exact difference?
15. A train left Watertown at 2:00 P.M. on Tuesday and arrived in Cityville at 9:30 A.M. on Wednesday. How long did the trip take?
16. A typing test showed that Jason can type 140 words in 4 min. How many words can he type in 10 min at that rate?
17. The noon temperature in Edwardsite was 37°F . By midnight that same day, the temperature had dropped to 12 degrees below zero. How many degrees did the temperature drop between noon and midnight?

18. What is the rule?



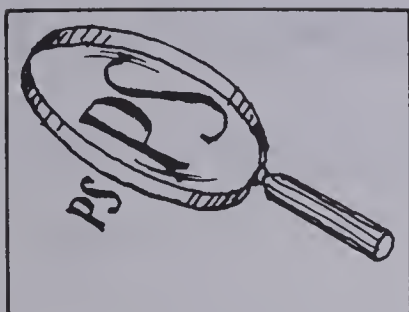
19. Mr. Schmidt estimated that 160 square yards of carpet would be needed to cover the living room and the family room. Is this a reasonable estimate?



20. What is the end-of-the-month balance for this checking account statement?

DATE	AMOUNT OF CHECK	AMOUNT OF DEPOSIT	BALANCE
			\$426.75
Oct. 1	\$ 95.50		
Oct. 10	156.75		
Oct. 16		\$15.78	
Oct. 26	185.24		
Oct. 31		56.48	

Teacher's Resources



Problem Solving

What is it?

Definitions of mathematical problem solving and descriptions of its scope continue to be developed by teachers and researchers. George Polya has said that to solve a problem is to find a way where no way is known offhand, to find a way out of difficulty, to find a way around an obstacle, to attain a desired end that is not immediately attainable by appropriate means.



A supermarket manager wants to build a square pyramid with cans of apple juice. The bottom layer is to be 8 cans wide.
How many cans will the display use?

Its Importance

Achieving success in problem solving continues to be an important student objective for teachers at all grade levels. Recent mathematics assessments have highlighted the fact that while most students do well on computational items, they perform poorly on exercises requiring problem solving or application of mathematical skills.

The National Council of Teachers of Mathematics Priorities in School Mathematics Project (PRISM) found that classroom teachers, mathematics educators, and lay people all supported the position that problem solving should receive greater emphasis in the curriculum. In their recommendation for school mathematics in the 1980's, the N.C.T.M. proposed that problem solving be the focus of school mathematics.

As a result of these concerns, mathematics educators across the United States have made problem solving a major focal point.

Where do we start?

By its very nature, problem solving is frustrating. Since answers do not come quickly, it is easy to become impatient and avoid future problem situations. Consequently, it is crucial that a positive, low pressure, relaxed classroom atmosphere be used so that student interest in and success with problem solving can be attained.

The following suggestions can help to create a pleasant problem-solving atmosphere in the classroom.

1. Let the students feel successful.
2. Start with easy problems.
3. Work in small groups.
4. Relax the usual success-and-failure standards.
5. Be patient.
6. Remove pressures.
7. Have fun.
8. Be positive.
9. Share ideas and strategies.

What does it involve?

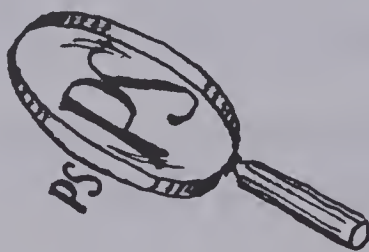
Heuristics, such as George Polya's four-step problem solving procedure, form a conceptual framework for productive problem solving. Polya's procedure is well known and respected by curriculum developers, teachers, and students.

Polya's Plan

1. Understand the problem.
2. Devise a plan.
3. Carry out the plan.
4. Look back.

The program closely follows Polya's four-step procedure with its *IDEA* plan.

1. **I**dentify.
2. **D**ecide.
3. **E**valuate.
4. **A**nswer.



Teaching Suggestions

UNIT 1: Organizing Facts

Objective

Organize information using lists and charts.

Notes

In this unit, lists or charts are suggested as a means of organizing information in a sequential manner so that possible outcomes are not overlooked. The first two pages provide practice in using charts for listing information in a suggested order to solve problems.

Page 4 and 5 involve charts commonly used in competition. Information about a tournament or particular contest is given. By correctly recording the given information on the chart, the student is able to determine a tournament winner.

UNIT 2: Guessing and Testing

Objective

Guess a possible solution and test the guess for accuracy.

Notes

The first two pages of this unit provide practice in solving problems using addition and subtraction. At this level, the student will have to solve the problems by trial and error. Emphasize the importance of a reasonable guess to reduce the number of attempts required to solve each problem. Accurate testing of a “guessed” answer is required. You may wish to let students use a calculator to relieve the tediousness of repeated calculations.

Pages 8 and 9 provide a variety of nonroutine problems which will have to be solved by guessing and testing. These problems do not necessarily require computation to find a solution. Provide grid paper for the problems on page 9.

UNIT 3: Choosing the Operation

Objective

Choose the operation that will solve a given problem.

Notes

Pages 10 and 11 provide practice in focusing on key words in a problem. Each question provides a set of facts and three expressions using the facts. The student is to write a question for each expression. Encourage students to use as many different key words as possible when writing questions (total, in all, altogether, and so on). The given expressions involve the operations of addition, subtraction, and multiplication.

Pages 12 and 13 require the student to choose the correct expression to solve a problem. Most of the problems involve money. The comparison symbols, $<$ and $>$, are also used on these two pages.

UNIT 4: Using Pictures

Objective

Use information from pictures.

Notes

The first two pages of this unit give all necessary information in a picture. The student must interpret the picture to obtain the information required to solve a given problem.

Pages 16 and 17 provide experience in drawing pictures to help organize facts which enable the student to solve a problem. The importance of drawing pictures (in many different situations) to help organize and interpret information should be stressed. It is suggested that students work in small groups as they solve these problems. Time for discussion and comparison of the various pictures made should also be provided.

UNIT 5: Reasonable Answers

Objective

Check answers for reasonableness.

Notes

The first two pages of this unit provide practice using rounding skills to find the most reasonable of three approximate answers. Emphasize that the exact answer is not required for this set of questions. Point out that rounding should be used before performing an operation rather than doing the actual computation and then rounding.

Pages 20 and 21 require the student to find a reasonable answer for a given problem. Again emphasize that the exact answer is *not* the desired response, but rather a reasonable answer (found by rounding).

UNIT 6: Extra Information

Objective

Select required facts in problems with extraneous information.

Notes

This unit provides practice in selecting information needed from more information than is necessary to solve the problem. The student should decide what the question asks and what information would be required to answer the question before selecting the required data. If this procedure is followed, the extraneous matter will not confuse the problem solver and the extra data can be ignored.

Students are not required to write the extra facts on any of the four pages of this unit. Yet, it is beneficial for the students to point out the unnecessary facts orally.

UNIT 7: Review

Objective

Review the following problem-solving strategies:

1. Organizing facts
2. Guessing and testing
3. Choosing the operation
4. Using pictures
5. Reasonable answers
6. Extra information

Notes

This unit provides a review of Units 1 to 6. The questions are presented in the order of the units (questions from Unit 1 come first; then Unit 2, and so on) so that a student may go back to the original unit and review the problem-solving strategy if necessary.

UNIT 8: Number Patterns

Objective

Recognize number patterns.

Notes

The first two pages of this unit provide practice in recognizing number patterns and then completing the patterns. The number patterns are given in charts or tables to help the student discover the patterns.

Use the shading patterns the students devise for problem 3, page 30, as challenge questions for the entire class. Some students may need a sheet of polygons having up to 10 sides to solve problem 6, page 31. Ask the students to explain the pattern rules for questions 7 to 12, page 31.

Pages 32 and 33 relate the number patterns to graphing (ordered pairs) skills. Upon completion of Unit 8 in the text, the student should be able to name and graph ordered pairs. On page 32, the student is to use the pattern rule to find the second number in the ordered pair and to write the rule, given a pair of related numbers.

For questions 7 to 12 on page 33, encourage the students to first write the ordered pair for each point on the graph and then to determine the pattern. Discuss the patterns the students used as they completed questions 13 to 24.

UNIT 9: Using a Calculator

Objective

Use a calculator to facilitate problem solving.

Notes

The first 2 pages of this unit provide practice in using rounding skills. A calculator is used to check the accuracy of the estimate. To ensure that the student rounds and estimates before using a calculator to find the exact answer, both the estimate and the exact answer are required to be written.

Pages 36 and 37 require the student to solve problems using the guess-and-test method first introduced in Unit 2. A calculator is used to facilitate computation.

Questions 1 to 5, page 36, involve exponents. Point out how some calculators have a constant key to facilitate this process. Allow the students several days to solve question 12, page 37.

UNIT 10: Using Diagrams

Objective

Use diagrams to organize facts.

Notes

Page 38 and 39 of this unit provide practice in interpreting information given in a diagram or drawing a diagram to organize the given information. Discuss thoroughly the example problem at the top of page 38 which introduces the usefulness of Venn Diagrams. Students should then be able to interpret the Venn Diagram given in problems 1, 2, and 3 on page 38 and to draw a Venn Diagram to solve problem 6 on page 39.

The problems on pages 40 and 41 are nonroutine problems which do not require computation to solve. Discuss the example on page 40 with the aid of an overhead projector or chalkboard illustration. Encourage discussion of solution strategies. Look for the use of number patterns.

UNIT 11: Multi-Step Problems

Objective

Solve problems requiring two or more computational steps.

Notes

The first two pages of this unit provide practice in solving problems requiring two separate computational steps. The student may write the problem as two or more sub-problems, finding the answer to step one and using the answer in

step two; or write the computation in a number sentence using brackets to indicate the order of operations. For example, problem 2, page 42:

$$\begin{array}{r} 168 \\ +228 \\ \hline 396 \end{array} \quad \begin{array}{r} 33 \\ 12 \overline{)396} \end{array} \quad \text{or } (168 + 228) \div 12 = 33$$

Problems on pages 44 and 45 usually require three separate computational steps in order to find the answer. Discuss the example on page 44. Have the students devise the possible corresponding number sentences:

$$(85 \times \$0.02) + (85 \times \$0.05) = \$5.95 \text{ or } 85 \times (\$0.02 + \$0.05) = \$5.95$$

UNIT 12: Applications

Objective

Solve application problems.

Notes

The problems on the first two pages of this unit involve computation with averages, money, temperatures, scales, and areas.

The problems on pages 48 and 49 focus on time and money. Use a map of the United States along with the time zone information at the top of page 48. Have the students devise other problems similar to the page 48 example problem. In the last four problems, page 49, the student finds the balance in a checking account after checks have been written on or deposited to the account.

UNIT 13: Organizing for Logic Problems

Objective

Organize for logical solutions.

Notes

Number theory problems requiring logical thinking are introduced in the first two pages of this unit. The student will encounter rules for divisibility, multiples, factors, and average in learning some of the combinations and patterns which numbers follow. Through logical thinking, the student should be encouraged to note combinations or patterns which can be applied in similar situations.

Pages 52 and 53 provide practice in using a chart to solve logic problems. Emphasize the use of the (X) and the (✓) as they eliminate possible solutions. The example problem should be thoroughly discussed. Upon completion, the solutions to problems 1 to 4, page 53, should also be talked about as the charts used to solve these problems are drawn on an overhead projector or on the chalkboard.

UNIT 14: Review

Objective

Review the following problem-solving strategies:

- | | |
|---------------------------|-----------------------------------|
| 1. Organizing facts | 8. Number patterns |
| 2. Guessing and testing | 9. Using a calculator |
| 3. Choosing the operation | 10. Using diagrams |
| 4. Using pictures | 11. Multi-step problems |
| 5. Reasonable answers | 12. Applications |
| 6. Extra information | 13. Organizing for logic problems |

Notes

This unit provides a review of all units in the booklet. The questions do not appear in any particular order. The students may use any previously-learned strategy to solve the problems.

Answers

ANSWERS

Unit 1

- Page 2
1. 12 21 31
13 23 32

2. 3579 5379 7359 9357
3597 5397 7395 9375
3759 5739 7539 9537
3795 5793 7593 9573
3957 5937 7935 9735
3975 5973 7953 9753
3. Biff-Frank, Biff-Sara, Biff-Maria,
Frank-Sara, Frank-Maria, Sara-Maria
- Page 3
4. Six roads

5.

Alice	Bob	Cindy	Dave	Elsie	Faro
Bob Cindy Dave Elsie Faro	Cindy Dave Elsie Faro	Dave Elsie Faro	Elsie Faro	Faro	

6. 5643, 6543, 4653, 6453, 4563, 5463, 4635, 6435, 3645, 6345, 4365, 3465
7. 120, 130, 140, 210, 230, 240, 310, 320, 340, 410, 420, 430, 102, 302, 402, 312, 412, 132, 142, 342, 432, 104, 204, 304, 214, 314, 124, 134, 234, 324

- Page 4
1. first, Car 14; second, Car 9; third, Car 21; fourth, Car 4; fifth, Car 15
- Page 5
2. Blue 3. Kim 4. Beavers won 2; Bears won 3; Bobcats won 0; Buffalos won 1. 5. Lakeside

Unit 2

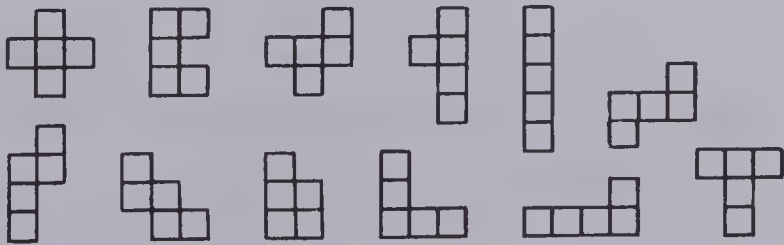
- Page 6
1. 128 and 129 2. 192, 193, 194 3. 11 and 7
4. 236 and 197 5. 24-10, 7-0, 17-6
- Page 7
6. won 11-8, 6-1 and lost 10-9 7. answers vary 8. answers vary
9. 48 10. 22 11. $164 + 759 = 923$, $923 - 823 = 100$, $A = 1$, $B = 6$, $C = 4$, $D = 7$, $E = 5$, $F = 9$, $G = 8$, $H = 2$, $I = 3$
- Page 8
1. 2 dimes and 1 quarter 2. 4 dimes, 1 nickel, and 35 pennies
3. one solution is: 35 pennies, 7 nickels, and 1 dime
4. hot dog, cake, and milk ($\$0.85 + \$0.95 + \$0.20 = \2.00)

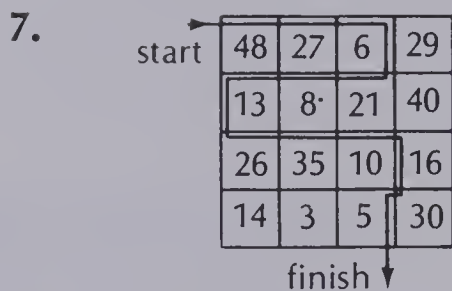
Page 9

5.

3	2	4	1
1	4	2	3
2	3	1	4
4	1	3	2

6. 12 ways





8.

24	−	13	+	43	=	54
−		+		−		−
16	−	12	+	28	=	32
−		−		−		−
6	+	22	−	13	=	15
=		=		=		=
2	+	3	+	2	=	7

9. A, B, C, D, and F

Unit 3

Page 10 Answers vary.

Page 11 Answers vary.

Page 12 1. c, 444 2. c, green 3. b, \$16.80 4. b, \$4.02

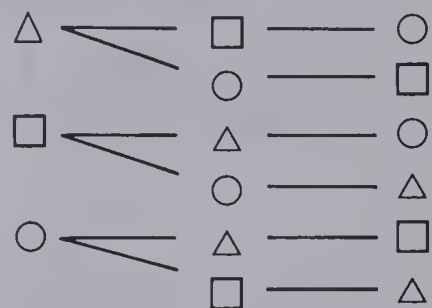
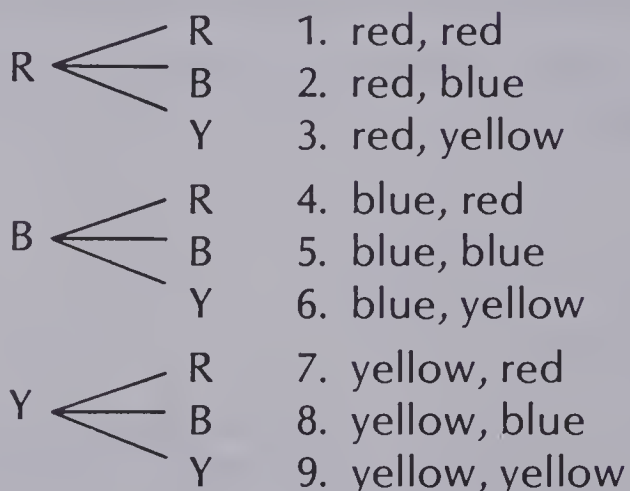
Page 13 5. b, 47 6. a, \$99.04 7. b, 218 8. a, \$10.94 9. c, 170 10. c, a man's bike

Unit 4

Page 14 1. 6 cm 2. 5 cm 3. 7 cm 4. 3 cm

Page 15 5. 0.5 m 6. 1.1 m 7. 1.5 m 8. 60 9. 30 10. 480 11. 15 12. 15

Page 16 1. Chair: Table: 2. 1st: 2nd: 3rd:



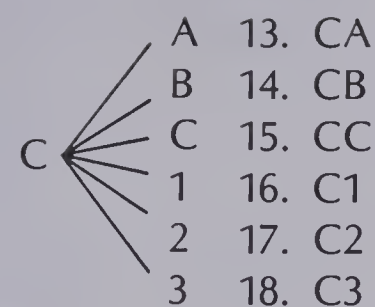
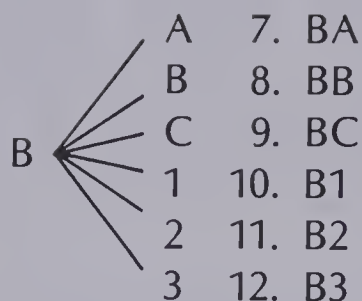
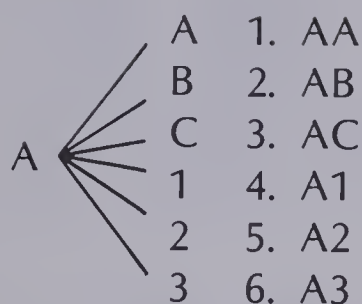
Page 17 3. 1st bill: 2nd bill: 3rd bill:

\$1	\$5	\$10	1. \$1, \$5, \$10
\$5	\$10	\$5	2. \$1, \$10, \$5
\$10	\$1	\$10	3. \$5, \$1, \$10
	\$10	\$1	4. \$5, \$10, \$1
	\$1	\$5	5. \$10, \$1, \$5
	\$5	\$1	6. \$10, \$5, \$1

4. Six different snacks are possible.

5. 11 tiles in each row and column, an 11 by 11 square

6. 1st: 2nd:



7. There are 42 different ice cream cones possible.

Unit 5

Page 18 1. c 2. a

Page 19 3. b 4. a 5. c 6. b 7. b

Page 20 1. about 800 people 2. about 270 students 3. about 1300 km

Page 21 4. about 200 people 5. about 60 newspapers 6. about 190 seats

7. no 8. about \$5.50 9. no 10. yes

Unit 6

Page 22 1. 313,681 people 2. 550 mi

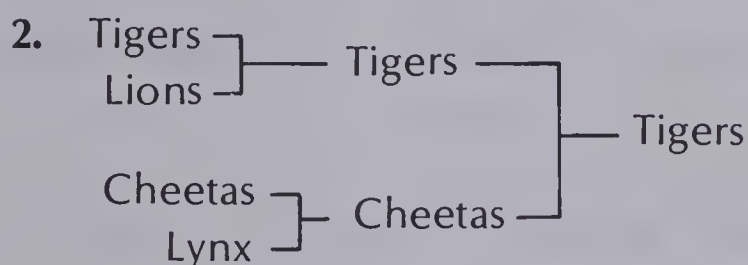
Page 23 3. 40 units 4. 1280 km 5. Manitoba 6. \$1.33 7. 80 brownies
8. \$107.50 9. 45 years old 10. 389 students

Page 24 1. 9 h 2. \$7.50 3. \$6.98 4. 24 cartons 5. \$2397.00 6. \$9.00
7. 7:00 P.M.

Page 25 8. 7 9. 4 10. apples, berries, corn, potatoes, onion

Unit 7

Page 26 1. first, Prime Oak; second, Spruce Glen; third, Garden Site;
fourth, Ferndale; fifth, Braegrove



3. grade 6, Lora;
grade 5, Anil;
grade 4, Chas;
grade 3, Jenny

Page 27 4. 60 quarters, 10 dimes, 20 nickels, 3 pennies 5. 24, 25, 26
6. $2 + 4 + 7 + 9 + 6 + 3 + 1 = 32$ 7. b, \$29.98 8. b, 6155 9. a, 19

Page 28 1. 17.5 sq yd 2. 27.5 sq yd 3. 19.25 sq yd 4. 32.5 sq yd
5. 8 6. 27 7. 12

Page 29 8. about 32,000 people 9. about 28°C 10. no 11. 52 students
12. 258 flyers 13. \$0.49

Unit 8

Page 30

1.

<div>48</div>	<div>1632</div>
---------------	-----------------

<div>48</div>	<div>1632</div>
---------------	-----------------

<div>48</div>	<div>1632</div>
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<div>48</div>	<div>1632</div>
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<div>48</div>	<div>1632</div>
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<div>48</div>	<div>1632</div>
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<div>48</div>	<div>1632</div>
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2.

<div>139</div>	<div>139</div>
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<div>139</div>	<div>139</div>
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<div>139</div>	<div>139</div>
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<div>139</div>	<div>139</div>
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<div>139</div>	<div>139</div>
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<div>139</div>	<div>139</div>
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Page 31

4.

Cities	2	3	4	5	6	7	8	9	10	N
Roads	1	3	6	10	15	21	28	36	45	$\frac{N \times (n - 1)}{2}$

5. 64 sections 6. 35 diagonals (same as Question 4 but not counting outside edges).

7. 5, 6, 8, 11, 15, 20, 26, 33 8. 3, 6, 12, 24, 48, 96, 192, 384
9. 12.8, 23.7, 34.6, 45.5, 56.4, 67.3, 78.2, 89.1
10. 10, 11, 9, 12, 8, 13, 7, 14 11. $1, 2\frac{1}{2}, 4\frac{1}{4}, 8\frac{1}{8}, 16\frac{1}{16}, 32\frac{1}{32}, 64\frac{1}{64}, 128\frac{1}{128}$
12. $12 \times 36 = 432$
 $15 \times 36 = 540$
 $18 \times 36 = 648$

Page 32

1.

56	14
36	9
20	5
0	0

2.

0	12
2	18
5	27
9	39

3.

2	3
8	15
15	29
23	45

4. Rule: $\times 3$ 5. Rule: $\div 25$ 6. Rule: $+2, \times 3$

Page 33

7. $+4$ 8. $\times 9$ 9. $\div 8$ 10. $+1$ 11. -3 12. $\times 6$
13. (1,2) (2,4) (3,6) (4,8) (5,10) (6,12) 19. (6,10) (5,12) (4,15) (3,19) (2,24) (1,30)
14. (3,0) (6,3) (9,6) (12,9) (15,12) (18,15) 20. (1,2) (2,4) (3,8) (4,16) (5,32) (6,64)
15. (2,1) (4,2) (6,3) (8,4) (10,5) (12,6) 21. (1,7) (2,10) (3,13) (4,16) (5,19) (6,22)
16. (1,8) (2,7) (3,6) (4,5) (5,4) (6,3) 22. (1,2) (2,5) (3,10) (4,17) (5,26) (6,37)
17. (1,4) (2,7) (3,10) (4,13) (5,16) (6,19) 23. (2,18) (4,16) (6,14) (8,12) (10,10) (12,8)
18. (1,3) (2,7) (3,11) (4,15) (5,19) (6,23) 24. (2,20) (4,16) (6,12) (8,8) (10,4) (12,0)

Unit 9

Page 34

1. 24,998 2. 15,530 3. 39,973 4. 323

Page 35

5. 23.04 cm² 6. 33¢ 7. \$49.64
8. 19¢ cheaper 9. 126,205.6 10. \$17.00

Page 36

1. 32 2. 9 3. 3 4. 6 5. 125

Page 37

6. 28 and 32 7. 24 and 46 8. $>$ 9. $<$ 10. 18 11. $1 \times 11, 2 \times 10, 3 \times 9, 4 \times 8, 5 \times 7$, and 6×6 The 6×6 rectangle has the largest area.

12. a.	2948	b.	4059	c.	7601
	3160	— from b.	5338		2215 — from a.
	8529		1892		8046
	+6377		+9725		+3152
	<u>21,014</u>		<u>21,014</u>		<u>21,014</u>

Unit 10

Page 38 1. delivering papers, allowance, babysitting 2. Bill, Mia, Joe
3. 5 students

Page 39 4. 320 ft 5. The shortest distance is to travel 4 mi west.
6. 17 students took Math but not Science.
7. The pool is 2 m deep.
8. A to B to C to D 9. The pet shop is southwest of his home.
10. 2187 sq ft

Page 40 1. 10 2. 20 3. 10 4. 30

Page 41 5. B 6. A 7. C 8. 7 9. 15 10. 23

11.



12.



Unit 11

Page 42 1. 40 points 2. 33 bags 3. \$43.20 4. 2640 lines

Page 43 5. 360 cm² 6. 2.75 oz 7. \$1.58 8. 25 min 9. \$3.44 10. 96 mi 11. 8.64 m²

Page 44 1. 9 h 2. 16 h 3. 22 points

Page 45 4. 22 penalties 5. 120 min 6. 1020 m² 7. 5 h 30 min 8. \$4.65 9. \$2238

Unit 12

Page 46 1. 106° 2. \$56.18 3. \$41.40

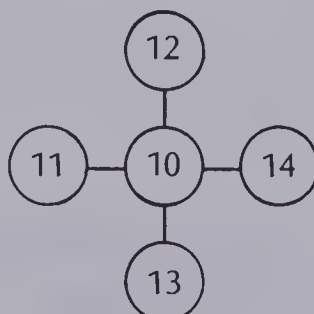
Page 47 4. 75°F 5. 13°C 6. 19 points 7. 20 m 8. \$651.05

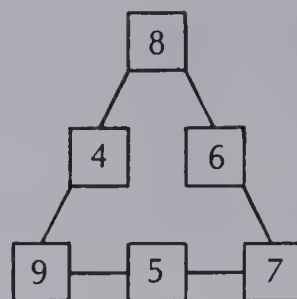
Page 48 1. 7 h 12 min 2. There are 3 stops. 3. 13:00 or 1:00 P.M.

Page 49 4. 35 h 5. 13.62 s 6a. \$14.73 6b. \$89.73 6c. \$27.60 6d. \$23.35
6e. \$113.35 6f. \$2.85 7. \$243.40 8. \$246.25 9. yes

Unit 13

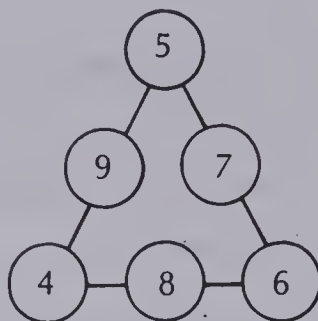
Page 50 1. 72
2. One solution is:





5. 72, 90, 108, 126, 144, 162, and 180

6. One solution is:



7. 131 8. 135 9. 24

1. Stacey, brown hair; Jack, red hair; Esther, blond hair; Louis, black hair
2. John, Nfld.; Dave, Alta.; Rob, Ont.; Bill, Sask.
3. Petra, parakeet; Victor, dog; Jeff, gerbil
4. Fran Mayor, doctor; Paul Doctor, barber; Stewart Barber, mayor

Unit 14

1. a 2. Janet, doctor; John, lawyer; Kevin, teacher 3. \$2.37
4. 1 quarter, 2 dimes, 2 nickels, and 14 pennies 5. 132
6. 504 and 297

7. 33 R3, 44 R4, 55 R5, 66 R6, 77 R7, 88 R8 8. 82, 83, 84, 85
9. 239 students 10a. 24 10b. 96 10c. 168 11a. 58 students
- 11b. 16 students

12.

Team	Wins	Losses
Blue	37	25
Brown	32	27
Gold	31	29
Green	31	29
Black	27	31

13. \$3.25 14. about 40,000, 42,465 15. 19 h 30 min
16. 350 words 17. 49°F 18. $\times 20$

19. yes 20. \$61.52

JUN 23 1989

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